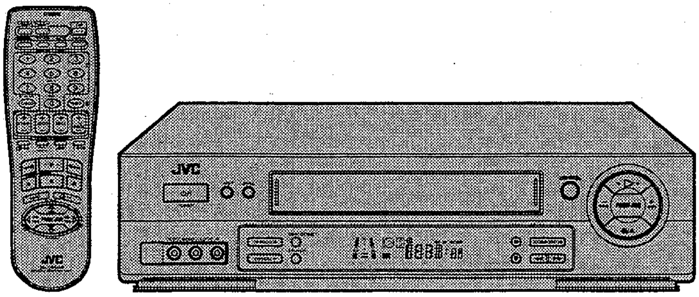
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER

HR-J657MS



Hi-Fi

VHS
PAL NTSC

SPECIFICATIONS

GENERAL

Power requirement	
Rating	: AC 110 – 240 V∿, 50/60 Hz
Operating	: AC 90 – 260 V∿, 50/60 Hz
Power consumption	: 22 W
Temperature	
Operating	: 5°C to 40°C
Storage	: –20°C to 60°C
Operating position	: Horizontal only
Dimensions (WxHxD)	: 400 x 94 x 340 mm
Weight	: 3.8 kg
Format	: VHS standard
Maximum recording time	
(SP)	: 240 min. with E-240 video cassette (PAL/MESECAM) : 160 min. with T-160 video cassette (NTSC)
(LP)	: 480 min. with E-240 video cassette (PAL/MESECAM)
(EP)	: 480 min. with T-160 video cassette (NTSC)

VIDEO/AUDIO

Signal system	: PAL-type colour signal and CCIR monochrome signal, 625 lines 50 fields : NTSC colour and EIA monochrome signals, 525 lines/60 fields
Recording system	: DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	: 45 dB
Horizontal resolution	: 250 lines (PAL/MESECAM) : 220 lines (NTSC)
Frequency range	: 70 Hz to 10,000 Hz (Normal audio) 20 Hz to 20,000 Hz (Hi-Fi audio)
Input/Output	: RCA connectors (IN x 2, OUT x 1)

TUNER/TIMER

TV channel storage capacity	: 99 positions (+AUX position)
Tuning system	: Frequency synthesized tuner
Channel coverage	: VHF (Low) 42 – 175 MHz (High)175 – 470 MHz UHF 470 – 870 MHz
Aerial output	: UHF channels (Adjustable E28 – E60)
Memory backup time	: Approx. 6 months Estimated figure based on supplied fresh battery; actual performance may differ.

ACCESSORIES

Provided accessories	: RF cable, Infrared remote control unit, "R6/UM-3" battery x 2, Lithium battery CR2025, Conversion plug*

*Not provided in certain areas.

Specifications shown are for SP mode unless otherwise specified.
Design and specifications subject to change without notice.

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No. 82686
August 1998

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

●Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

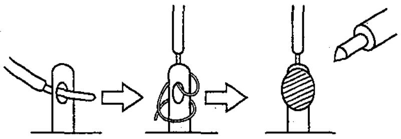


Fig.1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

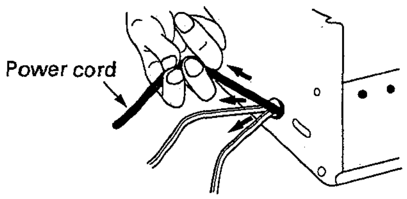


Fig.2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

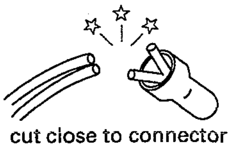


Fig.3

       (2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

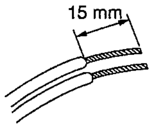


Fig.4

       (3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

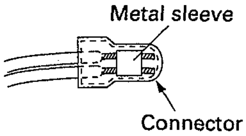


Fig.5

       (4) As shown in Fig.6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

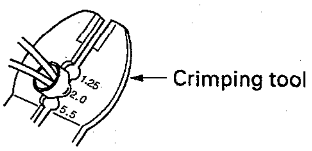


Fig.6

       (5) Check the four points noted in Fig.7.

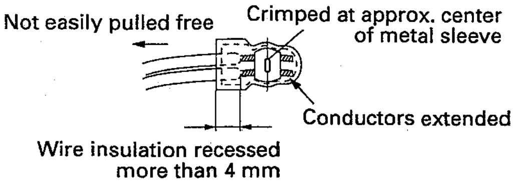

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig.7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. **Dielectric strength test**
Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. **Clearance distance**
When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

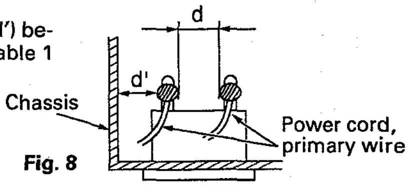


Fig. 8

4. **Leakage current test**
Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
Measuring Method : (Power ON)
Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

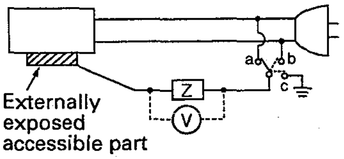


Fig. 9

5. **Grounding (Class Ⅰ model only)**
Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
Measuring Method:
Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

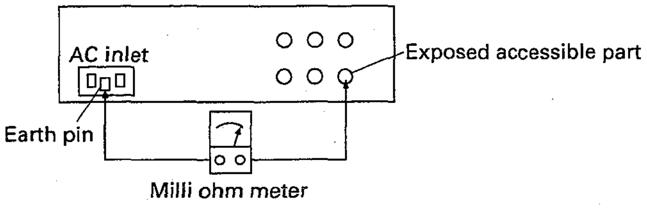


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 miute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 1 kV 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ/500 V DC	AC 3 kV 1 minute (Class Ⅱ) AC 1.5 kV 1 minute (Class Ⅰ)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

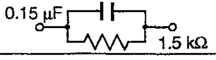
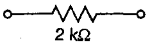
AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	 0.15 μF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	 2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

Safety Precautions

The rating plate and the safety caution are on the rear of the unit.

WARNING: DANGEROUS VOLTAGE INSIDE

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

CAUTION

- When you are not using the recorder for a long period of time, it is recommended that you disconnect the power cord from the mains outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the mains outlet prior to connecting or disconnecting any signal lead or aerial.
- Use the conversion plug (not provided in certain areas) depending on the type of your AC wall outlet.

ATTENTION

1. This recorder can also receive SECAM colour television signals for recording and playback.
2. Recordings made of SECAM television signals produce monochrome pictures if played back on another video recorder of SECAM standard, or do not produce normal colour pictures if played back on another video recorder of PAL standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.

POWER SYSTEM

This set operates on voltage of AC110 – 240 V∿ (Rating), AC90 – 260 V∿ (Operating), 50/60 Hz with automatic switching.

Warning on lithium battery

The battery used in this device may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, heat above 100°C or incinerate.
Replace battery with Panasonic (Matsushita Electric), Sanyo, Sony or Maxell CR2025; use of another battery may present a risk of fire or explosion.

- Dispose of used battery promptly.
- Keep away from children.
- Do not disassemble and do not dispose of in fire.

VHS PAL NTSC HQ

- Only cassettes marked "VHS" can be used with this videorecorder.
- HQ VHS is compatible with existing VHS equipment.

IMPORTANT

- Please read the various precautions on this page before installing or operating the recorder.
- It should be noted that it may be unlawful to re-record pre-recorded tapes, records, or discs without the consent of the owner of copyright in the sound or video recording, broadcast or cable programme and in any literary, dramatic, musical, or artistic work embodied therein.

The POWER ⏻/I button does not completely shut off mains power from the unit, but switches operating current on and off. " ⏻ " shows electrical power standby and " I " shows ON.

Video tapes recorded with this video recorder in the LP (Long Play) or EP (Extended Play) mode cannot be played back on a single-speed video recorder.

Failure to heed the following precautions may result in damage to the recorder, remote control or video cassette.

1. **DO NOT place the recorder . . .**
   - ... in an environment prone to extreme temperatures or humidity.
   - ... in direct sunlight.
   - ... in a dusty environment.
   - ... in an environment where strong magnetic fields are generated.
   - ... on a surface that is unstable or subject to vibration.
2. **DO NOT block the recorder's ventilation openings.**
3. **DO NOT place heavy objects on the recorder or remote control.**
4. **DO NOT place anything which might spill on top of the recorder or remote control.**
5. **AVOID violent shocks to the recorder during transport.**

MOISTURE CONDENSATION

Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, or under extremely humid conditions—just as water droplets form in the surface of a glass filled with cold liquid. Moisture condensation on the head drum will cause damage to the tape. In conditions where condensation may occur, keep the recorder turned on for a few hours to let the moisture dry.

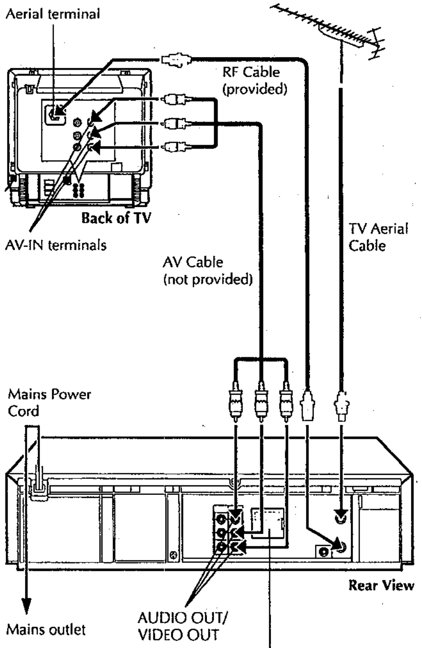
ABOUT HEAD CLEANING

Accumulation of dirt and other particles on the video heads may cause the playback picture to become blurred or interrupted. Be sure to contact your nearest JVC dealer if such troubles occur.

Auto Head Cleaner

A built-in head cleaner automatically cleans the video heads and head drum whenever a tape is loaded or unloaded to reduce head clogging.

Basic Connections



Connect the power plug to an AC outlet before installing the lithium battery. ☞ pg. 5

It's essential that your video recorder be properly connected. Follow these steps carefully. THESE STEPS MUST BE COMPLETED BEFORE ANY VIDEO OPERATION CAN BE PERFORMED.

1 CHECK CONTENTS

Make sure the package contains all of the accessories listed in "Specifications" (☞ pg. 41).

2 SITUATE RECORDER

Place the recorder on a stable, horizontal surface.

3 CONNECT RECORDER TO TV

The connection method you use depends on the type of TV you have.

RF CONNECTION

- *To Connect To A TV With NO AV Input Terminals . . .*
  - a– Disconnect the TV aerial cable from the TV.
  - b– Connect the TV aerial cable to the ANT. IN jack on the rear panel of the recorder.
  - c– Connect the provided RF cable between the RF OUT jack on the rear panel of the recorder and the TV's aerial terminal.

AV CONNECTION

- *To Connect To A TV With AV Input Terminals . . .*
  - a– Connect the aerial, recorder and TV as per "RF CONNECTION".
  - b– Connect an optional AV cable between the AUDIO OUT and VIDEO OUT connectors on the rear panel of the recorder and the TV's AV-IN terminals .

4 CONNECT RECORDER TO MAINS

Plug the end of the mains power cord into a mains outlet.

NOTE:

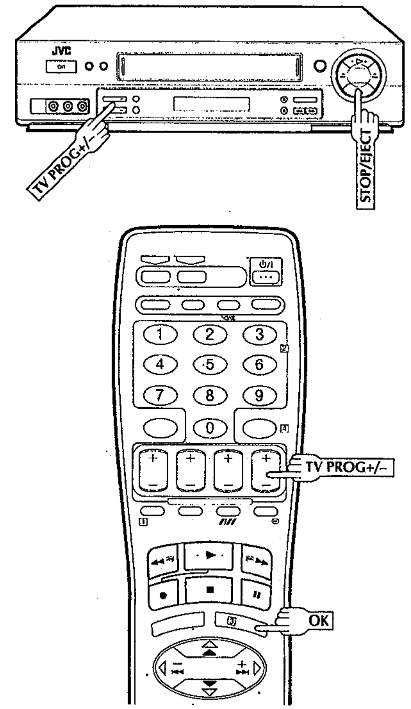
Use the conversion plug (not provided in certain areas) depending on the type of your AC wall outlet.

ATTENTION

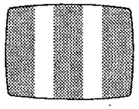
If you have finished all the necessary connections, go to "Video Channel Set" on page 4, then perform Auto Set Up on page 6; do NOT press the ⏻/I button on the recorder/remote control to turn on the recorder's power before you start Auto Set Up.

Video Channel Set

Video Channel (RF Output Channel) is the channel on which your TV receives picture and sound signals from the video recorder through the RF cable.



TEST SIGNAL



The channel on which the screen to the left appear clearly in step 3 is your Video Channel.

To view picture signals from the video recorder, set your TV to the Video Channel.

If you have connected the video recorder to your TV via the provided RF cable only (RF connection) – Go to "With RF Connection" below.

If you have connected the video recorder to your TV via both the provided RF cable and an AV cable (AV connection) – Go to "With AV Connection" on next page.

With RF Connection

IMPORTANT:
Before performing the following steps, make sure the recorder's power is off and there is no cassette inserted in the recorder.

1 ACCESS VIDEO CHANNEL SET MODE

Hold down **STOP/EJECT** on the recorder until the display panel shows the following.

10 UT 36

2 SELECT TV SYSTEM

Press **TV PROG** + or – to set appropriate TV system that matches the system of TV being used (refer to the table below).

20 UT 36

1 : B/G 2 : D/K 3 : I 4 : M

Major Countries	TV System
Kuwait, U.A.E., Indonesia, Singapore,Thailand, Malaysia, Iran, Saudi Arabia, Egypt, Morocco, Lebanon, Iraq	B/G
China, Mongolia, Russia	D/K
Hong Kong	I
U.S.A., Japan, S.Korea, Taiwan	M

3 SET VIDEO CHANNEL

Set your TV to UHF channel 36.

- If the two vertical white bars appear clearly on the screen as shown in the illustration (☞ "TEST SIGNAL" on page 4), press **OK** and then go to step **4**.
- If the two vertical white bars do not appear clearly, press **OK** and then **TV PROG** + or – to set the video recorder to a vacant channel between 28 and 60 which is not occupied by any local station in your area.

(Ex.) If channel 50 is available in your area

20 UT 50

Then set your TV to UHF channel 50 and check if the two vertical white bars appear clearly on the screen; if so, go to step **4**. If not, re-set the video recorder to another vacant channel and try again.

NOTES:
- *If you set the video recorder to a channel which is occupied by a local station or has neighbouring channels that are occupied by local stations, the picture reception quality will be affected and some interference noise will appear on the TV screen. Be sure to select a vacant channel which has no broadcast on neighbouring channels.*
- *If you cannot obtain the two vertical white bars clearly with any channel between 28 and 60, consult your JVC dealer.*

4 FINISH VIDEO CHANNEL SET

Press **OK**.

- **If Auto Set Up (☞ pg. 6) or Tuner Set (☞ pg. 30) has not previously been performed, the Language Select screen appears and Auto Set Up function takes place automatically.**

With AV Connection

IMPORTANT:
Before performing the following steps, make sure the recorder's power is off and there is no cassette inserted in the recorder.

1 ACCESS VIDEO CHANNEL SET MODE

Hold down **STOP/EJECT** on the recorder until the display panel shows the following.

10 UT 36

2 SET VIDEO CHANNEL

Press **OK**, then press **TV PROG** – until the display panel shows the following.

10 UT - -

Now the video channel is set to off (– –).

3 FINISH VIDEO CHANNEL SET

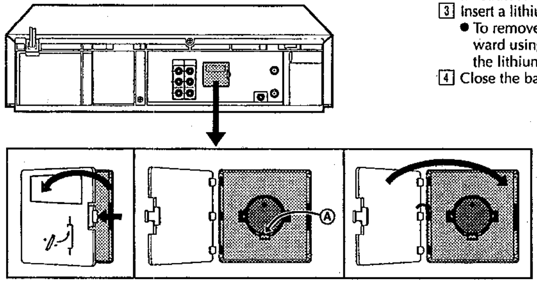
Press **OK**.

- **If Auto Set Up (☞ pg. 6) or Tuner Set (☞ pg. 30) has not previously been performed, the Language Select screen appears and Auto Set Up function takes place automatically.**

To view picture signals from the video recorder, set your TV to its AV mode.

• •

Be sure to connect the power plug to an AC outlet first before installing the lithium battery; otherwise, the battery's service life will be drastically shortened.



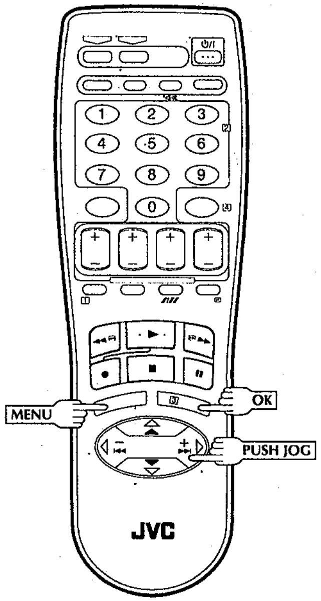
Installing/Removing the lithium battery

1. Make sure that the power plug is connected to an AC outlet and turn off the VCR power.
2. Open the battery cover while pressing the release tab as illustrated.
3. Insert a lithium battery with the plus (+) side up and push it in.
   - To remove the lithium battery, press the latch Ⓐ downward using a pointed non-metallic object, then pull out the lithium battery.
4. Close the battery cover until it clicks in place.

Auto Set Up

IMPORTANT

- Don't press any buttons on the recorder or remote that are not directly related to the step you are performing while Auto Set Up is in progress.
- If you perform Auto Set Up successfully during installation, there's no need to separately perform the Language Select, Clock Set or Channel Set procedures, but if adjustments become necessary they can be performed as follows:
  - To change the selected language ☞ pg. 9
  - To reset or adjust the time ☞ pg. 9
  - To add/delete channels manually ☞ pg. 31
  - To reset the tuner after moving to a different location ☞ pg. 30



The Auto Set Up function simplifies installation by guiding you through the procedures of setting the language, clock and tuner channels — simply follow the on-screen menus that appear.

Before starting, make sure of the following:
- The TV aerial cable should be connected to the recorder.
- The recorder's mains power cord should be connected to a mains outlet. ☞ pg. 3
- The "Video Channel Set" procedure should be done first and the TV should be set to its AV mode (with AV connection ☞ pg. 5) or video channel (with RF connection ☞ pg. 4).

1 SELECT LANGUAGE

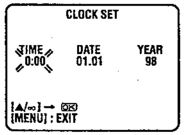
Press **PUSH JOG** △▽ to place the pointer next to your desired language (English or Chinese), then press **OK** or **PUSH JOG** ▷.

- The Clock Set screen appears.

2 SET TIME

Press **PUSH JOG** △▽ to set the time, then press **OK** or **PUSH JOG** ▷.

- Press and hold either button to delay or advance the time by 30 minutes.



CLOCK SET

TIME 0:00
DATE 01.01
YEAR 98

[▲/▼] → OK
[MENU] : EXIT

3 SET DATE

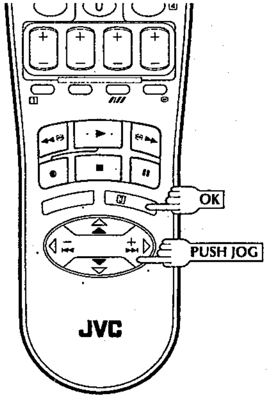
Press **PUSH JOG** △▽ to set the date, then press **OK** or **PUSH JOG** ▷.

- Press and hold either button to change the date by 15 days.

4 SET YEAR

Press **PUSH JOG** △▽ to set the year, then press **MENU**.

Major Countries	TV System
Kuwait, U.A.E., Indonesia, Singapore, Thailand, Malaysia, Iran, Saudi Arabia, Egypt, Morocco, Lebanon, Iraq	B/G
China, Mongolia, Russia	D/K
Hong Kong	I
U.S.A., Japan, S.Korea, Taiwan	M



5 SELECT TV SYSTEM

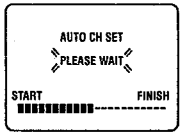
Press **PUSH JOG** △▽ to place the pointer next to the appropriate TV system (refer to the table on the left).

6 START AUTO CHANNEL SET

Press **OK** or **PUSH JOG** ▷.

- The Auto Set Up function scans all the channels that are receivable by your recorder. It then automatically assigns each receivable channel to the **TV PROG** buttons. It skips non-receivable channels.
- As Auto Set Up progresses, the "▮" mark on the screen moves from left to right. (See below.)

DO NOT press any button on the recorder or remote control while Auto Set Up is in progress.



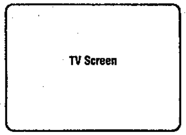
AUTO CH SET

PLEASE WAIT

START FINISH

During Auto Set Up
"PLEASE WAIT" blinks on the screen and "Auto" blinks on the front display panel.

➡



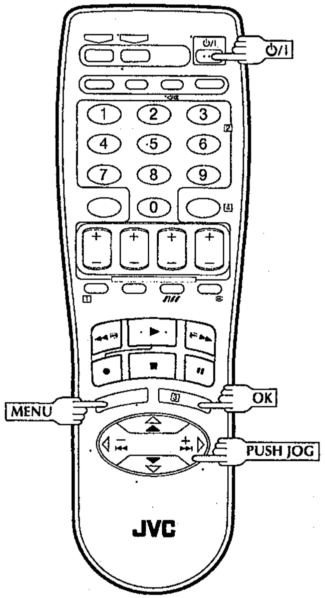
When Auto Set Up is completed, the lowest position number will appear on the front display panel.

NOTES:

- *If you perform Auto Set Up when the aerial cable is not connected properly, "SCAN COMPLETED -NO SIGNAL-" appears on the screen. When this happens, make sure of the aerial connection and press* ***OK****; Auto Set Up will take place again.*
- *If there is a power cut, or if you press ⏻/I or* **MENU** *while Auto Set Up is in progress, Auto Set Up will be interrupted; be sure to turn off the recorder power once and try again.*
- *If you want to set the tuner manually such as to add or skip channels, to swap channel positions, or to fine-tune channels, ☞ pg. 31–33.*
- *If no sound accompanies the picture on some channels that have been stored by Auto Set Up, the TV system setting for those channels may be incorrect. Select the appropriate TV system for those channels. ☞ "TV System Selection – When you see the picture but hear no audio" on page 33.*

On-Screen Displays

Turn on the TV and select the VIDEO channel (or AV mode).



You can choose whether or not to have various operational indicators appear on screen, by setting this function ON or OFF.

1 TURN ON THE RECORDER

Press ⏻/I.

2 ACCESS MAIN MENU SCREEN

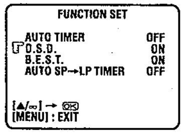
Press **MENU**.

3 ACCESS FUNCTION SET SCREEN

Place the pointer next to "FUNCTION SET" by pressing **PUSH JOG** △▽, then press **OK** or **PUSH JOG** ▷.

4 ENABLE/DISABLE ON-SCREEN DISPLAY

The default setting is "ON", so if you want on-screen displays, leave the setting as it is and go to step **5**. If you don't want the displays to appear, press **PUSH JOG** △▽ to place the pointer next to "O.S.D." and press **OK** or **PUSH JOG** ▷ to set to "OFF".



FUNCTION SET

AUTO TIMER OFF
☞O.S.D. ON
B.E.S.T. ON
AUTO SP→LP TIMER OFF

[▲/∞] → OK
[MENU] : EXIT

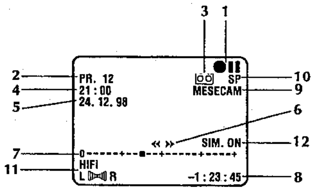
5 RETURN TO NORMAL

Press **MENU**.

NOTES:

- *When you use this recorder as the player for editing, be sure to set "O.S.D." to "OFF" before starting.*
- *During playback, the operation mode indicators may be disturbed depending on the type of tape being used.*

The superimposed indication on the TV screen tells you what the recorder is doing.



1– Operation mode indicators
2– Channel position number/Aux. indicator (L-1 or F-1)
3– Cassette loaded mark
4– Clock display
5– Current day/month/year
6– Tape direction
7– Tape position indicator (☞ pg. 13)
8– Counter display
9– Colour system indicator (☞ pg. 28)
10– Tape speed SP/LP/EP
11– Audio mode display (☞ pg. 14)
12– Simulcast recording indicator (☞ pg. 17)

Select Language

Turn on the TV and select the VIDEO channel (or AV mode).

1 TURN ON THE RECORDER

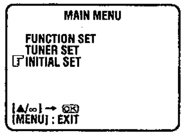
Press ⏻/I.

2 ACCESS MAIN MENU SCREEN

Press **MENU**.

3 ACCESS INITIAL SET SCREEN

Press **PUSH JOG** △▽ to place the pointer next to "INITIAL SET", then press **OK** or **PUSH JOG** ▷.



MAIN MENU

FUNCTION SET
TUNER SET
☞INITIAL SET

[▲/∞] → OK
[MENU] : EXIT

4 ACCESS LANGUAGE SELECT SCREEN

Press **PUSH JOG** △▽ to place the pointer next to "LANGUAGE", then press **OK** or **PUSH JOG** ▷.

5 SELECT LANGUAGE

Place the pointer next to the language of your choice (English or Chinese) by pressing **PUSH JOG** △▽, then press **OK** or **PUSH JOG** ▷.

6 RETURN TO NORMAL SCREEN

Press **MENU**.

Clock Set

Turn on the TV and select the VIDEO channel (or AV mode).

1 TURN THE RECORDER ON

Press ⏻/I.

2 ACCESS MAIN MENU SCREEN

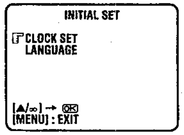
Press **MENU**.

3 ACCESS INITIAL SET SCREEN

Press **PUSH JOG** △▽ to place the pointer next to "INITIAL SET", then press **OK** or **PUSH JOG** ▷.

4 ACCESS CLOCK SET SCREEN

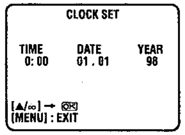
Press **PUSH JOG** △▽ to place the pointer next to "CLOCK SET", then press **OK** or **PUSH JOG** ▷. The Clock Set screen appears.



INITIAL SET

☞CLOCK SET
LANGUAGE

[▲/∞] → OK
[MENU] : EXIT



CLOCK SET

TIME	DATE	YEAR
0: 00	01 . 01	98

[▲/∞] → OK
[MENU] : EXIT

5 SET TIME

Press **PUSH JOG** △▽ to set the time, then press **OK** or **PUSH JOG** ▷.

- Press and hold either button to delay or advance the time by 30 minutes.

6 SET DATE

Press **PUSH JOG** △▽ to set the date, then press **OK** or **PUSH JOG** ▷.

- Press and hold either button to change the date by 15 days.

7 SET YEAR

Press **PUSH JOG** △▽ to set the year.

8 START CLOCK OPERATION

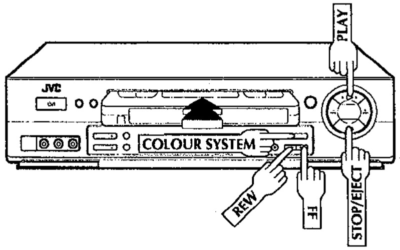
Press **MENU**.

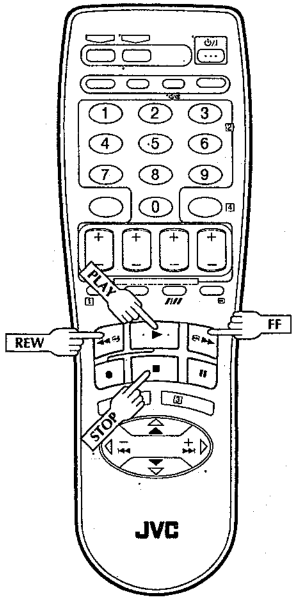
NOTE:

If the year digits are automatically cleared, it is possible that you have input 29th February for a non-leap year. Input the correct data.

Basic Playback

Turn on the TV and select the VIDEO channel (or AV mode).





The easiest, most basic operation possible with your video recorder is tape playback. Already-recorded signals on a video tape are read by your video recorder and displayed on your TV just like a TV programme.

1 LOAD A CASSETTE

Make sure the window side is up, the rear label side is facing you and the arrow on the front of the cassette is point toward the recorder. Don't apply too much pressure when inserting.

- The recorder power comes on automatically and the counter is reset to 0:00:00.
- Select the appropriate colour system by pressing the **COLOUR SYSTEM** button. (☞ pg. 28)
- If the record safety tab has been removed, playback begins automatically. (☞ pg. 15)

2 FIND PROGRAMME START POINT

If the tape is advanced past the start point, press **REW**. To go forward, press **FF**.

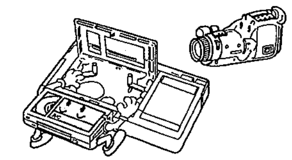
3 START PLAYBACK

Press **PLAY**. "BEST" appears blinking in the recorder's display panel during automatic tracking. (☞ pg. 18)

4 STOP PLAYBACK

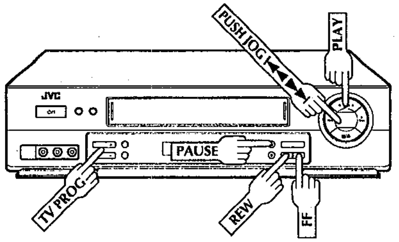
Press **STOP** on the remote or **STOP/EJECT** on the recorder's front panel. Then press **STOP/EJECT** to remove the cassette.

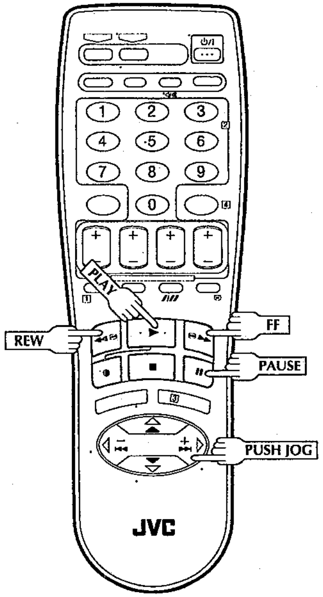
Usable cassettes



- Compact VHS camcorder recordings can be played on this video recorder. Simply place the recorded cassette into a VHS Cassette Adapter and it can be used just like any full-sized VHS cassette.
- This video recorder can record on regular VHS and Super VHS cassettes. However, it will record and play back regular VHS signals only. It is not possible to play back a recorded Super VHS tape.

Playback Features





ATTENTION

In the search, still, slow-motion or frame-by-frame playback mode,
- the picture will be distorted.
- the noise bars will appear.
- there will be a loss of colour with an LP-recorded tape.

Variable-Speed Search

1 ACTIVATE VARIABLE-SPEED SEARCH

During playback, press **PUSH JOG |◀◀** or **▶▶|**.

- The more times you press, the faster the playback picture moves.
- To decrease speed, press the button for the opposite direction.

To resume normal playback, press **PLAY**.

Still Picture/Frame-By-Frame Playback

1 PAUSE DURING PLAYBACK

Press **PAUSE**. If there is vertical jitter, use the **TV PROG** buttons to correct the picture.

2 ACTIVATE FRAME-BY-FRAME PLAYBACK

Press **PAUSE**.

OR

Press **PUSH JOG |◀◀** or **▶▶|**.

To resume normal playback, press **PLAY**.

Slow Motion

1 ACTIVATE SLOW-MOTION PLAYBACK

During still picture, press and hold **PAUSE** for 2 seconds, then release. Press and release again to return to still picture.

OR

During still picture, press and hold **PUSH JOG |◀◀** or **▶▶|**. Release to return to still picture.

To resume normal playback, press **PLAY**.

High-Speed Search

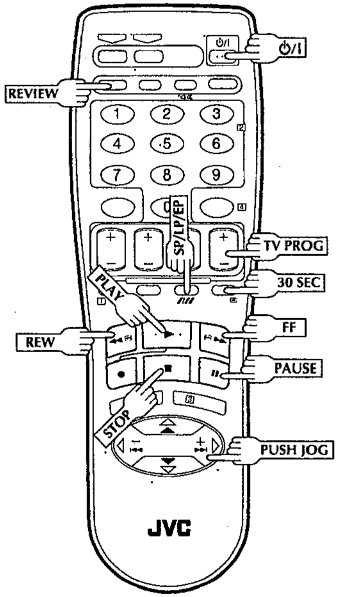
1 ACTIVATE HIGH-SPEED SEARCH

During playback or still, press **FF** for forward high-speed search, or **REW** for reverse high-speed search.

To resume normal playback, press **PLAY**.

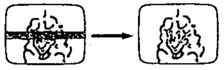
NOTE:

*For short searches, press and hold **FF** or **REW** for over 2 seconds during playback or still picture. When released, normal playback resumes.*



Manual Tracking

Your video recorder is equipped with automatic tracking control. During playback, you can override this and adjust the tracking manually by pressing the **TV PROG** buttons.



1 OVERRIDE AUTOMATIC TRACKING

Press **/// (SP/LP/EP)** on the remote to engage manual tracking.

2 ADJUST TRACKING MANUALLY

Press **TV PROG** + or – to adjust tracking.

3 RETURN TO AUTOMATIC TRACKING

Press **/// (SP/LP/EP)** on the remote to re-engage automatic tracking.

NOTE:

When a new tape is inserted, the recorder enters the automatic tracking mode automatically.

Repeat Playback

Your video recorder can automatically play back the whole tape 50 times repeatedly.

1 START PLAYBACK

Press **PLAY**.

2 ACTIVATE REPEAT PLAYBACK

Press **PLAY** and hold for over 5 seconds, then release.

- The Play indicator (▷) on the display panel blinks slowly.
- The tape plays 50 times automatically, and then stops.

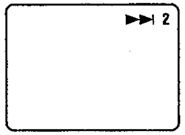
3 STOP PLAYBACK

Press **STOP** at any time to stop playback.

NOTE:

*Pressing **PLAY, REW, FF** or **PAUSE** also stops Repeat Playback.*

Index Search



Your recorder automatically marks index codes at the beginning of each recording. This function gives you quick access to any one of 9 index codes in either direction.

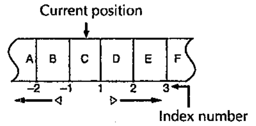
NOTE:

Before starting, make sure the recorder is in the Stop mode.

1 ACTIVATE INDEX SEARCH

Press **PUSH JOG** ◁ or ▷ (|◄◄ or ►►|) on the remote control. "|◄◄ 1" or "►►| 1" is displayed on screen and search begins in the corresponding direction.

- To access index codes 2 through 9, press **PUSH JOG** ◁ or ▷ repeatedly until the correct index number is displayed.
  Ex.: To locate the beginning of B from the current position, press **PUSH JOG** ◁ twice.
  To locate the beginning of D from the current position, press **PUSH JOG** ▷ once.



- When the specified index code is located, playback begins automatically.

Instant ReView

Simply by pressing a single button, the recorder power comes on, rewinds, and begins playback of the last timer-recorded programme. If you have several programmes recorded, you can easily access any of them.

NOTE:

Before starting, make sure that the recorder is off and that the Timer mode is disengaged.

1 ACTIVATE INSTANT REVIEW

Press **REVIEW**. The recorder power comes on and the recorder searches for the index code indicating the start of the last timer-recorded programme. Once it's found, playback begins automatically.

- The front display panel tells you how many programmes have been recorded. If you have, for example, 3 programmes, "REVIEW" and "3" appear and blink. To watch the first of the 3 programmes, press **REVIEW** three times. The recorder searches and begins playback automatically. You can access a programme as far as 9 index codes away from the current tape position.

NOTE:

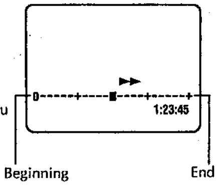
Instant ReView is not possible while the recorder is in the Timer mode.

Next Function Memory

You can set your recorder's power to go off automatically after the tape is fully rewound. Before starting, make sure the recorder is in the Stop mode.
For Automatic Power Off After Tape Rewind . . .
. . . press **REW**, then press ⏻/I within 2 seconds.

Tape Position Indicator

The tape position indicator appears on screen when, from the Stop mode, you press **FF, REW** or perform an Index Search. The position of "■" in relation to "0" (beginning) or "+" (end) shows you where you are on the tape.
"O.S.D." (☞ pg. 8) must be set to "ON", or the indicator will not appear.



NOTE:

Depending on the type of tape used, there may be times when the indication is not correct.

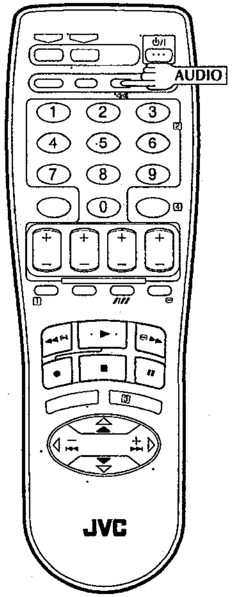
Skip Search

1 SKIP OVER UNWANTED SECTIONS

Press **30 SEC** 1 to 4 times during playback. Each press initiates a 30-second period of fast-motion playback. Normal playback resumes automatically.

NOTE:

*To return to normal playback during a Skip Search, press **PLAY**.*



Soundtrack Selection

Your video recorder is capable of recording three soundtracks (HI-FI L, HI-FI R and NORM) and will play back the one you select.

During Playback
Pressing **AUDIO** changes the soundtrack being played back as follows:

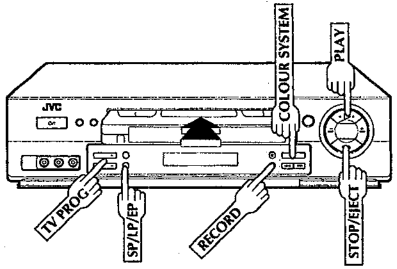
TRACK		USE
Recorder's Front Panel	On-Screen Display	
L + R	HI FI L ▷ ◁ R	For Hi-Fi stereo tapes
L	HI FI L ▷	For main audio of Bilingual tapes
R	HI FI ◁ R	For sub audio of Bilingual tapes
NORM	NORM	For audio-dubbed tapes
L + R + NORM	HI FI NORM	For audio-dubbed tapes

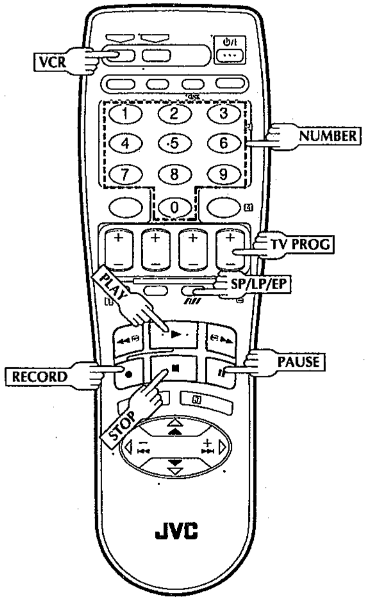
NOTES:

- *"L + R" should normally be selected. In this mode, Hi-Fi stereo tapes are played back in stereo, and the NORM track is played back automatically for tapes with only normal audio.*
- *"O.S.D." must be set to "ON" or the on-screen displays will not appear (☞ pg. 8).*

Basic Recording

- Turn on the TV and select the VIDEO channel (or AV mode).
- Press **VCR** on the remote control to select the VCR mode.





TV signals being received by the recorder's built-in tuner can be recorded onto a video tape. You can "capture" a TV programme using your video recorder.

1 LOAD A CASSETTE

Insert a cassette with the record safety tab intact.

- The counter is reset to 0:00:00 and the recorder power comes on automatically.
- Select the appropriate colour system by pressing the **COLOUR SYSTEM** button.(☞ pg. 28)

2 CHOOSE A PROGRAMME

Press **TV PROG +/–** or the **NUMBER** keys to select the channel you wish to record.

3 SET TAPE SPEED

Press **/// (SP/LP/EP)**. Check the SP/LP/EP indicator on the recorder display panel to confirm the selected tape speed.

4 START RECORDING

Press and hold **RECORD** and **PLAY** on the remote control, or press **RECORD** on the recorder.

B.E.S.T. takes place at the beginning of each first SP and first LP (or EP) recording after inserting the cassette (☞ pg. 18).

5 PAUSE/RESUME RECORDING

Press **PAUSE**. Press **PLAY** to resume recording.

6 STOP RECORDING

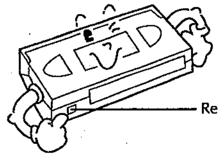
Press **STOP** on the remote control or **STOP/EJECT** on the recorder. Then press **STOP/EJECT** to remove the cassette.

Recording Resume Function

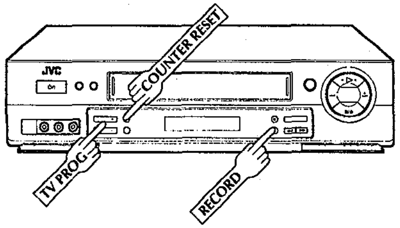
If there is a power outage during recording (or Instant Timer Recording or timer recording), the recording will resume automatically when power is restored to the recorder unless the recorder's memory backup has expired.

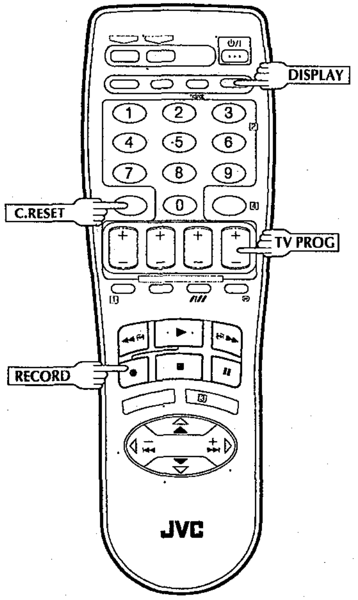
Accidental erasure prevention

- To prevent accidental recording on a recorded cassette, remove its safety tab. To record on it later, cover the hole with adhesive tape.



Recording Features





Record One Programme While Watching Another

1 SELECT CHANNEL TO WATCH

Once recording is in progress, all you need to do is to set the channel controls on the TV for the station you wish to view.

- The programme selected with the TV's channel controls appears on the TV screen while the one selected with the **TV PROG** buttons is recorded on the tape.

Elapsed Recording Time Indication

You can check the exact time of a recording.

1 SET COUNTER DISPLAY

Press **DISPLAY** until a counter reading appears on the dispay panel.

2 RESET COUNTER

Press **C. RESET** (or **COUNTER RESET**) before starting recording or playback.

- The counter is reset to "0:00:00" and shows the exact elapsed time as the tape runs.

Instant Timer Recording (ITR)

This easy method lets you record for from 30 minutes to 6 hours (selectable in 30-min. increments), and shuts the recorder off after recording is finished.

1 START RECORDING

Press **RECORD** on the recorder.

2 ENGAGE ITR MODE

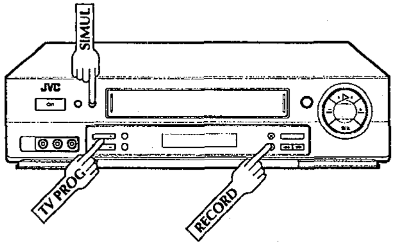
Press **RECORD** again. "◌" blinks and 0:30 appears on the front display panel.

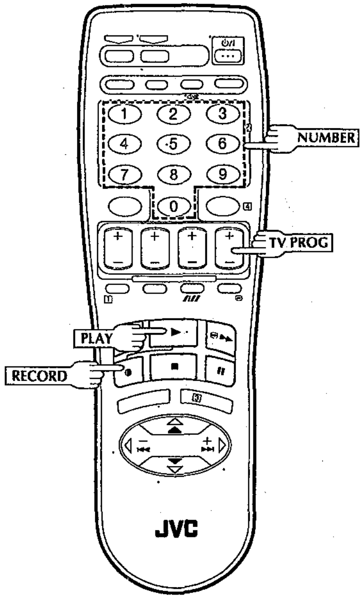
3 SET RECORDING DURATION

If you want to record for more than 30 minutes, press **RECORD** to extend the time. Each press extends recording time by 30 minutes.

NOTE:

*You can only perform ITR using the **RECORD** button on the recorder's front panel.*





Simulcast Recording

If FM simulcast TV programmes are available, you can record the TV programme with the soundtrack from an FM-broadcast. In the simulcast mode, the external audio programme is recorded on the audio track (both Hi-Fi and normal).

1 MAKE CONNECTIONS

Connect the FM tuner to the rear panel AUDIO IN connectors.

2 CHOOSE FM BROADCAST

Set the FM tuner to the desired broadcast.

3 SELECT TV PROGRAMME

Press **TV PROG** or the **NUMBER** keys to select the TV programme you wish to record.

4 ENGAGE SIMULCAST MODE

Press **SIMUL**.

- "SIM. ON" will appear on the screen.

5 START RECORDING

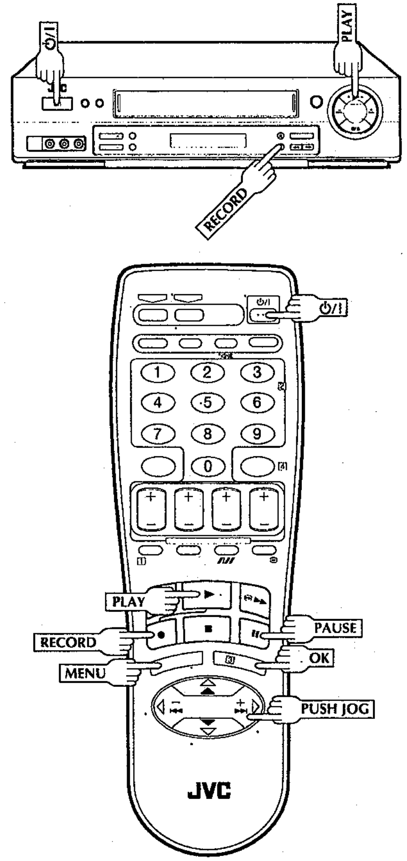
Press **RECORD** on the recorder (or **RECORD** and **PLAY** on the remote control).

NOTES:

- *If you stop recording with the **PAUSE** button to avoid unwanted TV programme material, the audio programme is also cut.*
- *After finishing simulcast recording, be sure to press the **SIMUL** button to cancel the Simulcast mode, otherwise it is not possible to record on the audio track from the built-in tuner.*
- *If TV broadcast is interrupted while simulcast recording, external audio input will not be recorded.*

B.E.S.T. Picture System

Turn on the TV and select the VIDEO channel (or AV mode).



The B.E.S.T. (Biconditional Equalised Signal Tracking) system checks the condition of the tape in use during recording and playback, and compensates to provide the highest-possible recording and playback pictures. The default setting for both recording and playback is "ON".

Preparation

1 TURN ON THE RECORDER

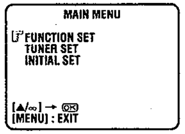
Press ⏻/I.

2 ACCESS MAIN MENU SCREEN

Press **MENU**.

3 ACCESS FUNCTION SET SCREEN

Place the pointer next to "FUNCTION SET" by pressing **PUSH JOG** △▽, then press **OK** or **PUSH JOG** ▷.



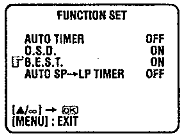
MAIN MENU

☞FUNCTION SET
TUNER SET
INITIAL SET

[▲/∞] → OK
[MENU] : EXIT

4 SELECT MODE

Place the pointer next to "B.E.S.T." by pressing **PUSH JOG** △▽, then press **OK** or **PUSH JOG** ▷ to set to "ON" or "OFF".



FUNCTION SET

AUTO TIMER	OFF
O.S.D.	ON
☞B.E.S.T.	ON
AUTO SP→LP TIMER	OFF

[▲/∞] → OK
[MENU] : EXIT

5 RETURN TO NORMAL SCREEN

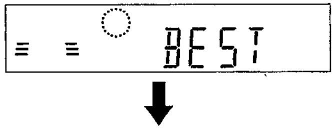
Press **MENU**.

Recording

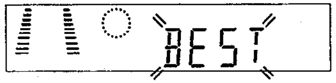
1 START RECORDING

Press and hold **RECORD** and press **PLAY** on the remote, or press **RECORD** on the recorder.

DURING B.E.S.T.



B.E.S.T. COMPLETE



- The recorder spends approximately 7 seconds assessing the condition of the tape, then begins recording.

NOTES:

- *The B.E.S.T. system works for both SP and LP (or EP) modes only after a tape has been inserted and the Record mode is first initiated. It does not work during recording.*
- *In the case of timer recording, the B.E.S.T. system works before recording is initiated.*
- *Once the cassette is ejected, the B.E.S.T. data is cancelled. The next time the cassette is used for recording, B.E.S.T. is re-performed.*
- *Pressing the recorder's **RECORD** button while "BEST" is displayed does not start Instant Timer Recording (☞ pg. 16).*

ATTENTION

*Since the B.E.S.T. system works before recording actually starts, there is a delay of approximately 7 seconds after **RECORD** and **PLAY** on the remote are pressed, or **RECORD** on the recorder is pressed. To make sure you record the desired scene or programme in its entirety, first perform the following steps:*

*1) Press and hold **PAUSE** and press **RECORD** to engage the RECORD PAUSE mode.*
  - *The recorder then automatically checks the condition of the tape and, after approximately 7 seconds, re-enters RECORD PAUSE.*

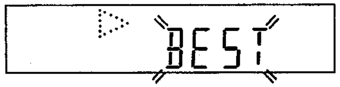
*2) Press **PLAY** to start recording.*
  - *If you want to bypass the B.E.S.T. system and begin recording immediately, set "B.E.S.T." to "OFF" in step 4 on page 18.*

Playback

The recorder assesses the quality of the tape once you initiate playback.

1 START PLAYBACK

Press **PLAY**.



- The recorder adjusts the playback picture quality based on the quality of the tape in use.
- B.E.S.T. is active during Auto Tracking. "BEST" appears blinking on the recorder's display panel.

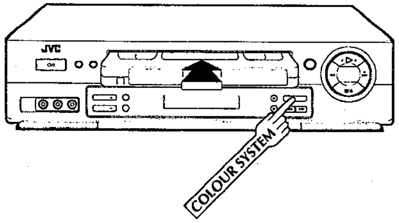
NOTES:

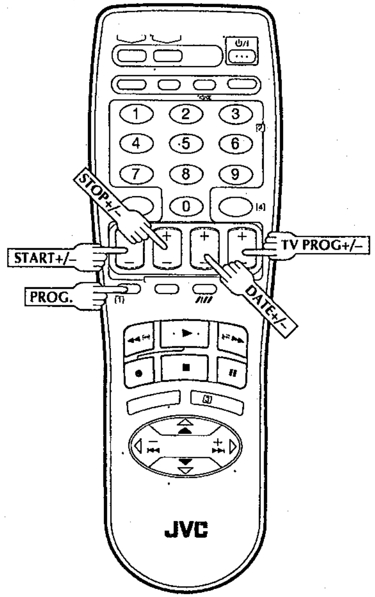
- *When watching a tape recorded with "B.E.S.T." set to "ON", it is recommended that you leave B.E.S.T. on during playback as well.*
- *When watching a rental tape or one recorded on another video recorder, or when using this recorder as the player for editing, set B.E.S.T. to your preference by performing steps **1** through **5** on page 18.*
- *"BEST" only appears at the beginning of automatic tracking. Even though it doesn't appear after that, the B.E.S.T. function is operative.*

Express Timer Programming

Remember, the clock must be set before you can programme the timer (☞ pg. 9).

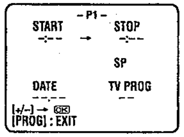
Before performing the following steps:
- Insert a cassette with the safety tab in place. The recorder will come on automatically.
- Turn on the TV and select the VIDEO channel (or AV mode).
- Select the appropriate colour system by pressing the **COLOUR SYSTEM** button.(☞ pg. 28)





1 ACCESS TIMER PROGRAMMING SCREEN

Press **PROG.**. (If you're just starting out, "P1" appears.)

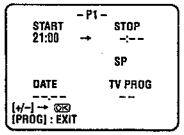


```
        - P1 -
START          STOP
 -:--    →     -:--

                SP

DATE          TV PROG
--.--           --
[+/–] → OK
[PROG] : EXIT
```

2 ENTER PROGRAMME START TIME

Press **START +/–** to enter the time you want recording to start.

- Press and hold **START +/–** to move in 30-minute increments, or press and release repeatedly to move 1 minute at a time.



```
        - P1 -
START          STOP
21:00    →     -:--

                SP

DATE          TV PROG
--.--           --
[+/–] → OK
[PROG] : EXIT
```

3 ENTER PROGRAMME STOP TIME

Press **STOP +/–** to enter the time you want recording to stop.

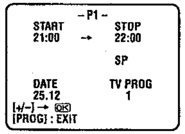
- Press and hold **STOP +/–** to move in 30-minute increments, or press and release repeatedly to move 1 minute at a time.

4 ENTER PROGRAMME DATE

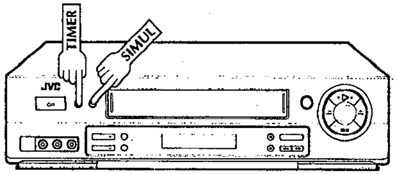
Press **DATE +/–**. (The current date appears on screen. The date you enter appears in its place.)

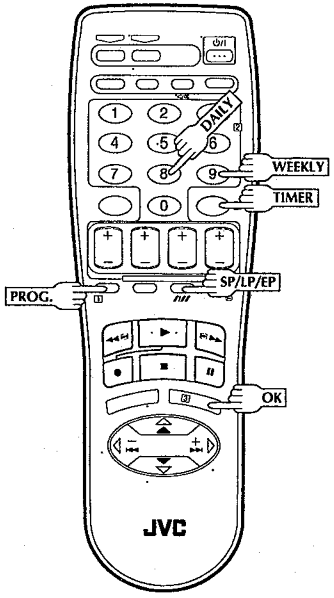
5 ENTER CHANNEL POSITION

Press **TV PROG +/–**.



```
        - P1 -
START          STOP
21:00    →     22:00

                SP

DATE          TV PROG
25.12           1
[+/–] → OK
[PROG] : EXIT
```





6 SET TAPE SPEED

Press /// **(SP/LP/EP)** to set the tape speed.

7 RETURN TO NORMAL SCREEN

After confirming all information is correct, press **PROG.** or **OK**. "PROGRAM COMPLETED" appears on the screen for about 5 seconds, then normal screen appears.

- Repeat steps **1** – **7** for each additional programme.

8 ENGAGE RECORDER'S TIMER MODE

Press **TIMER.** The recorder turns off automatically and ⊙ appears on the display panel.

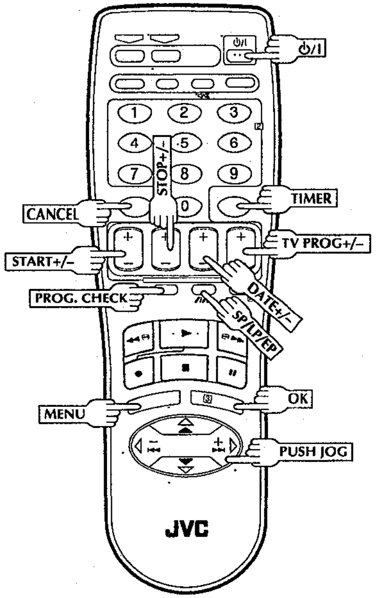
- To disengage the timer, press **TIMER** again.

To Timer-Record Weekly Or Daily Serials . . .
. . . anytime during steps **2** through **7**, press **WEEKLY** (**NUMBER** key "9") for weekly serials or **DAILY** (**NUMBER** key "8") for daily serials (Monday–Friday). Either "WEEKLY" or "DAILY" appears on the screen. Pressing the button again makes the corresponding indication disappear.

NOTE:

You can programme this recorder to timer-record as many as 8 programmes. If you try to programme the recorder to record a ninth, "PROGRAM FULL" appears on screen. To record the extra programme, you must first cancel any unnecessary programmes (☞ pg. 22).

To timer record with simulcast...
...While you perform steps **2** – **6**, press **SIMUL** at any time; "SIM" appears on the right of TV PROG number. Set the FM tuner to the desired broadcast before the selected programme begins. Then set the FM tuner's timer. If the tuner doesn't have a timer, leave the unit's power turned on.



Check, Cancel And Replace Programmes

1

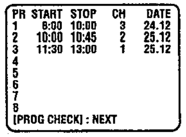
DISENGAGE TIMER MODE

Press **TIMER**, then press **⏻/I**.

2

ACCESS PROGRAMME CHECK SCREEN

Press **PROG. CHECK**.

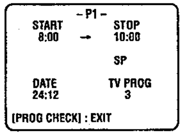


```
PR START  STOP   CH   DATE
1   8:00 10:00    3  24.12
2  10:00 10:45    2  25.12
3  11:30 13:00    1  25.12
4
5
6
7
8
[PROG CHECK] : NEXT
```

3

ACCESS PROGRAMME SCREEN

Press **PROG. CHECK** again to check more information. Each time you press **PROG. CHECK**, the next programme's information appears.



```
         - P1 -
 START           STOP
 8:00     →      10:00

                 SP

 DATE           TV PROG
 24:12             3

[PROG CHECK] : EXIT
```

To cancel or replace a programme...

4

CANCEL OR REPLACE A PROGRAMME

Press **CANCEL** to cancel a programme. To replace a programme, press the appropriate button: **START+/–, STOP+/–, DATE+/–, TV PROG+/–, SP/LP/EP (////)**.

5

RETURN TO NORMAL SCREEN

Press **PROG. CHECK** as many times as necessary. If there are still some programmes remaining, go on to step **6**.

6

RETURN TO TIMER MODE

Press **TIMER**.

Auto SP→LP Timer

If, when timer-recording in SP mode, there is not enough tape to record the entire programme, the recorder automatically switches to LP mode (with PAL broadcasts) or EP mode (with NTSC broadcasts) to allow complete recording.

For Example . . .

Recording a PAL-broadcast programme of 210 minutes in length onto a 180-minute tape

Approximately 150 minutes	Approximately 60 minutes
SP mode	LP mode

Total 210 minutes

Make sure you set "AUTO SP→LP TIMER" to "ON" at the Function Set screen before the timer-recording starts.

1

ACCESS MAIN MENU SCREEN

Press **MENU**.

2

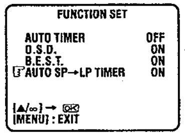
ACCESS FUNCTION SET SCREEN

Press **PUSH JOG △▽** to place the pointer next to "FUNCTION SET", then press **OK** or **PUSH JOG ▷**.

3

SELECT MODE

Press **PUSH JOG △▽** to place the pointer next to "AUTO SP→LP TIMER", then press **OK** or **PUSH JOG ▷** to select "ON".



```
        FUNCTION SET

  AUTO TIMER              OFF
  O.S.D.                   ON
  B.E.S.T.                 ON
☞AUTO SP→LP TIMER          ON


[▲/∞] → OK
[MENU] : EXIT
```

4

RETURN TO NORMAL SCREEN

Press **MENU**.

NOTES:

- *If you have programmed the recorder to timer-record 2 or more programmes, the second programme and those thereafter may not fit on the tape if you set "AUTO SP→LP TIMER" to "ON". In this case, make sure the mode is not engaged, then set the tape speed manually during timer programming.*
- *In order to ensure that the recording fits on the tape, this feature may leave a slight non-recorded section at the end of the tape.*
- *There may be some noise and sound disturbance at the point on the tape where the recorder switches from SP to LP (or EP) mode.*
- *The Auto SP→LP Timer feature is not available during ITR (Instant Timer Recording), and the feature will not work properly with any tapes longer than E-180 or with some tapes of shorter lengths.*

Auto Timer

When the Auto Timer is set to ON the timer is automatically engaged when the recorder power is turned off and automatically disengaged when the recorder is powered back on.

1

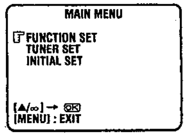
ACCESS MAIN MENU SCREEN

Press **MENU**.

2

ACCESS FUNCTION SET SCREEN

Press **PUSH JOG △▽** to place the pointer next to "FUNCTION SET", then press **OK** or **PUSH JOG ▷**.

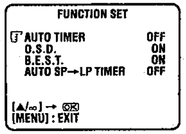


```
      MAIN MENU

☞FUNCTION SET
 TUNER SET
 INITIAL SET



[▲/∞] → OK
[MENU] : EXIT
```

3

SELECT MODE

Press **OK** or **PUSH JOG ▷** to select either "ON" or "OFF".



```
        FUNCTION SET

☞AUTO TIMER              OFF
 O.S.D.                   ON
 B.E.S.T.                 ON
 AUTO SP→LP TIMER        OFF


[▲/∞] → OK
[MENU] : EXIT
```

4

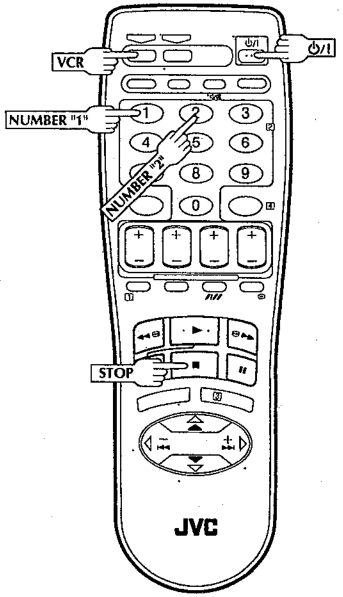
RETURN TO NORMAL SCREEN

Press **MENU**.

NOTE:

*For safety, when Auto timer is set to "OFF", all other recorder functions are disabled while the Timer mode is engaged. To disengage the timer, press **TIMER**.*

Remote Control Functions



Remote A/B Code Switching

The remote control is capable of controlling two JVC video recorders independently; one set to respond to the remote control's A code control signals and another set to respond to B code control signals. The remote control is preset to send A code signals because your video recorder is initially set to respond to A code signals. You can easily modify your video recorder to respond to B code signals.

1 REMOVE POWER SUPPLY

Unplug the mains power cord from the mains outlet.

2 SET REMOTE CONTROL CODE

While holding down **VCR** on the remote control, press the **NUMBER** key "2" and then press **STOP**.

3 RE-SUPPLY POWER

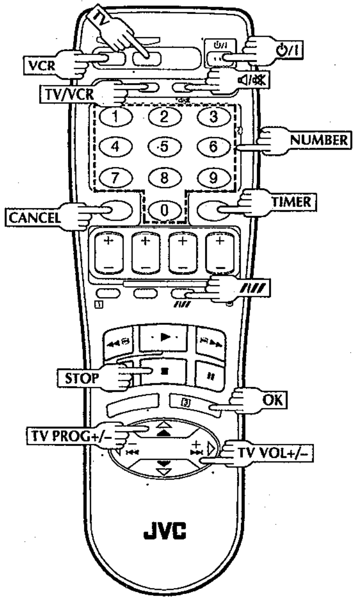
Plug the mains power cord back into the mains outlet.

4 TURN THE RECORDER ON

Press ⏻/I on the remote control. The recorder will now only respond to B code signals.

NOTE:

*To set the recorder back to respond to A code signals, repeat the same procedure as shown above except pressing **NUMBER** key "1" instead of "2" in step **2**.*



ATTENTION

The remote control can operate not only the video recorder but also some of your TV's functions.

- To operate your video recorder, first press the **VCR** button to set the remote control to the Video mode.
- To operate your TV, first press the **TV** button to set the remote control to the TV mode.

Control Your TV Using Additional Buttons

Use the **NUMBER** keys, and the **////** button, **CANCEL** button or **TIMER** button to select the TV's channel.

- With televisions under Code 01, 02, 03, 05, 07, 15, 16 or 22, the **////** button corresponds to the 1-digit/2-digit entry switching button (often labelled – /– –) of your TV's remote control.
- With televisions under Code 01, 08, 18 or 19, the **CANCEL** button corresponds to the 10 + button, and the **TIMER** button corresponds to the 20 + button of your TV's remote control.

NOTE:

The way these buttons are used is determined by your TV. Use these buttons as instructed for your TV's remote control.

TV Multi-brand Remote Control

Your remote control can operate the basic functions of your TV set. In addition to JVC TVs, other manufacturer's TVs can also be controlled.

Before you start . . .
- Turn on the TV using its remote control.

1 SET TV BRAND CODE

Refer to the chart below. While holding down **TV** on the recorder's remote control, enter your TV's brand code using the **NUMBER** keys, then press **STOP**. Check if the TV's power goes off as it should. If it does, try other operations (☞ step **2**)

- Once you have set the remote control to operate the TV, you don't have to repeat this step until you replace your remote control's battteries.
- SAMSUNG has two codes. If the TV does not function with one code, try entering another.

2 OPERATE TV

First, press **TV** to set the remote control to TV mode, then press the corresponding button: **⏻/I**, **TV PROG +/–**, **TV/VCR**, **TV VOL +/–** (Volume), **🔈/🔇** (Muting), **NUMBER** keys.

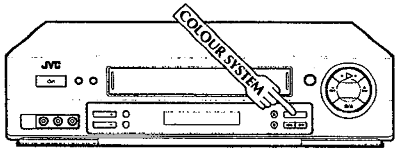
- For some brands of TV, you must press **OK** after having pressed the **NUMBER** keys.

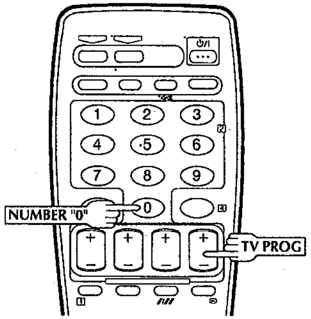
IMPORTANT

Although the provided remote control unit is compatible with JVC televisions, as well as many other models, it may not work with your TV, or in some instances, may have limited function capability.

TV BRAND NAME	CODE
JVC	01
PANASONIC	02
SONY	03
SHARP	04
TOSHIBA	05
CHANGHONG	05, 06, 16, 25
BEIJING	05, 27
MITSUBISHI	06
HITACHI	07
SANYO	08
FUNAI	09
AIWA	10
DAEWOO	11
SAMSUNG	12, 16
LG/GOLDSTAR	13
THOMSON	14
FERGUSON	15
PHILIPS	16
TCL	16, 28
GRUNDIG	17
ITT	18
MIVER	19
FINLUX	20
NOKIA	21
NEC	22
JINXING	23
PEONY	23,24,25
KONKA	26
NOBLEX	27

Edit To Or From Another Video Recorder


COLOUR SYSTEM
JVC


NUMBER "0"
TV PROG

You can use your video recorder as the source player or the recording deck.

1

MAKE CONNECTIONS

Connect the player's AUDIO/VIDEO OUT connector to the recorder's AUDIO/VIDEO IN connector.

- Use the L connector for monaural connection.

2

SET RECORDING DECK'S INPUT MODE

Set to AUX. With this video recorder, press **NUMBER** key "0" and/or **TV PROG** to select depending on the connector being used — "L-1" for the rear panel VIDEO/AUDIO input connectors, or "F-1" for the front panel VIDEO/AUDIO input connectors.

3

START SOURCE PLAYER

Engage its Play mode.

4

START RECORDING DECK

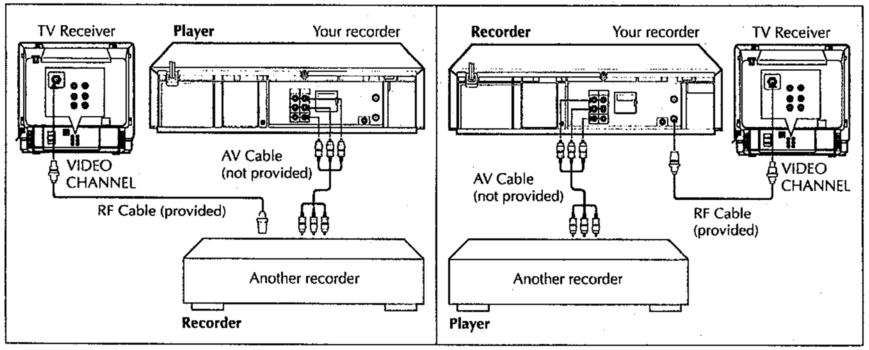
Engage its Record mode.

NOTES:

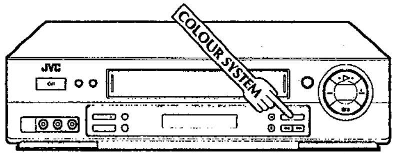
- *All necessary cables can be obtained from your dealer.*
- *NTSC tapes being played back in the NTSC → PAL mode (☞ p. 29) cannot be dubbed to another recorder.*
- *When you dub an NTSC tape using your recorder as the playback deck, select NTSC 3.58 (or NTSC 4.43) with the* ***COLOUR SYSTEM*** *button. (☞ p. 28)*

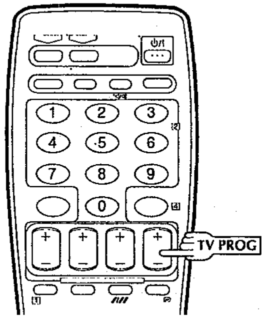
IMPORTANT:

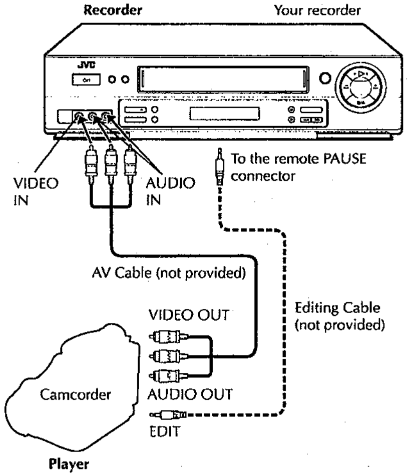
- To edit, both the player and the recorder must be of the same colour system. Press your recorder's **COLOUR SYSTEM** button to select the appropriate colour system.
- For more information on multi-system compatibility, ☞ pg. 28.


TV Receiver
Player
Your recorder
VIDEO CHANNEL
AV Cable (not provided)
RF Cable (provided)
Another recorder
Recorder
Recorder
Your recorder
TV Receiver
AV Cable (not provided)
VIDEO CHANNEL
RF Cable (provided)
Another recorder
Player

Edit From A Camcorder


COLOUR SYSTEM
JVC




Recorder
Your recorder
JVC
VIDEO IN
AUDIO IN
To the remote PAUSE connector
AV Cable (not provided)
VIDEO OUT
Editing Cable (not provided)
Camcorder
AUDIO OUT
EDIT
Player

You can use a camcorder as the source player and your video recorder as the recorder.

1

MAKE CONNECTIONS

Connect the camcorder's AUDIO/VIDEO OUT connectors to the recorder's front panel AUDIO/VIDEO input connectors.

- Use the L connector for monaural connection.
- When a Master Edit Control-equipped JVC camcorder is used, the camcorder is capable of controlling the recorder. Refer to the camcorder's instruction manual for operating procedure.

2

SET RECORDER'S INPUT MODE

Press **TV PROG** so that "F-1" appears on the display panel.

3

START CAMCORDER

Engage its Play mode.

4

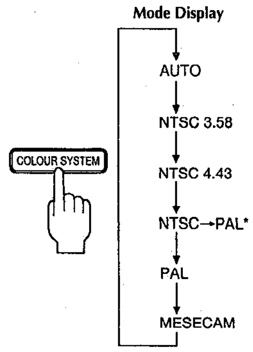
START RECORDER

Engage its Record mode.

IMPORTANT:

- To edit, both the player and the recorder must be of the same colour system. Press your recorder's **COLOUR SYSTEM** button to select the appropriate colour system.
- PAL, SECAM and NTSC camcorders can be used as a player for editing.
- For more information on multi-system compatibility, ☞ pg. 28.

Setting Of The Colour System Select Buttons


Mode Display
COLOUR SYSTEM
AUTO
NTSC 3.58
NTSC 4.43
NTSC→PAL*
PAL
MESECAM

* "NTSC→PAL" appears during playback only.

Use the **COLOUR SYSTEM** button on the front panel to select the colour system. Pressing this button changes the mode as illustrated on the left. The On-Screen display will show which mode is selected.

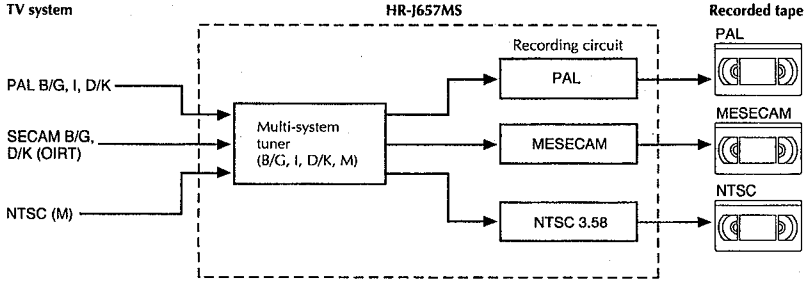
Mode	Description
AUTO	Usually set to this mode. This mode automatically detects PAL, NTSC, SECAM or MESECAM and adjusts to the colour system being recorded or played back. When it does not perform properly, set the colour system manually.
MANUAL	For recording, there is a choice of 4 selectable modes; PAL/MESECAM/NTSC 3.58/NTSC4.43. Select the mode that matches the colour signal being received. For playback, there is an additional mode which allows NTSC tapes to be played back and viewed on PAL TVs.

NOTES:

- *In the AUTO mode, NTSC signals will be automatically recorded as NTSC 3.58.*
- *In the AUTO mode, NTSC tapes will be played back as NTSC 3.58.*
- *SECAM signals will always be recorded as MESECAM. Select the AUTO or the MESECAM mode when recording SECAM signals.*
- *When playing back a SECAM tape, select the AUTO or MESECAM mode. The playback picture will always be monochrome.*
- *In the NTSC4.43 mode, with some TVs, on-screen displays (Program screen etc.) may roll up or down and there may be a loss of colour. When this happens, select the AUTO mode.*

Off-Air Recording

The built-in multi-system tuner is capable of receiving PAL B/G, I and D/K, and SECAM B/G and D/K and NTSC broadcasts.

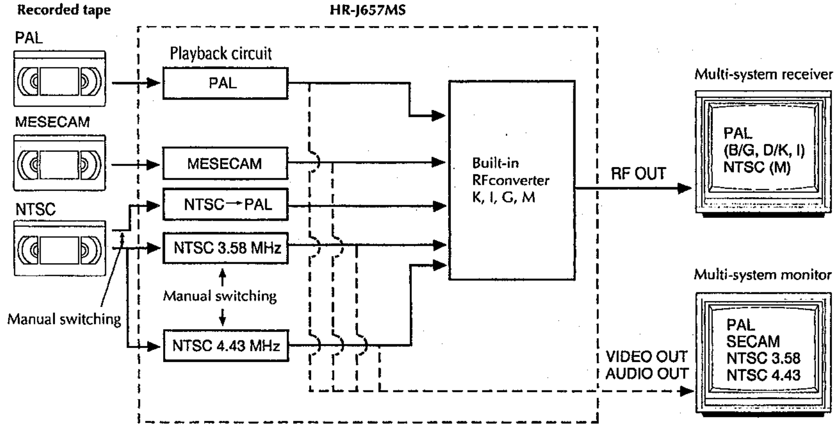

TV system
HR-J657MS
Recorded tape
PAL B/G, I, D/K
SECAM B/G, D/K (OIRT)
NTSC (M)
Multi-system tuner (B/G, I, D/K, M)
Recording circuit
PAL
MESECAM
NTSC 3.58
PAL
MESECAM
NTSC

NOTE:

This model does not operate in BRAZIL (PAL-M) or ARGENTINA (PAL-N).

Playback

This recorder can play back all 4 types of recorded tape.


Recorded tape
HR-J657MS
PAL
MESECAM
NTSC
Manual switching
Playback circuit
PAL
MESECAM
NTSC→PAL
NTSC 3.58 MHz
Manual switching
NTSC 4.43 MHz
Built-in RFconverter K, I, G, M
RF OUT
VIDEO OUT
AUDIO OUT
Multi-system receiver
PAL
(B/G, D/K, I)
NTSC (M)
Multi-system monitor
PAL
SECAM
NTSC 3.58
NTSC 4.43

NOTES:

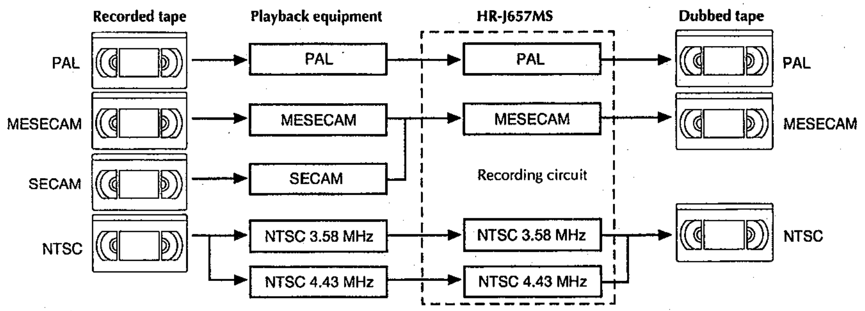
When viewing NTSC tapes on a PAL TV set:

- *The picture may shrink vertically with black bars appearing at the top and bottom of the screen. This is not a malfunction on the part of the video recorder nor the TV.*
- *The picture may roll up or down. This can be corrected using the V-HOLD control found on some TVs. (This cannot be corrected if the TV does not have a V-HOLD control.)*
- *During search, still, or frame-by-frame playback, the picture will be distorted, and there may be a loss of colour.*

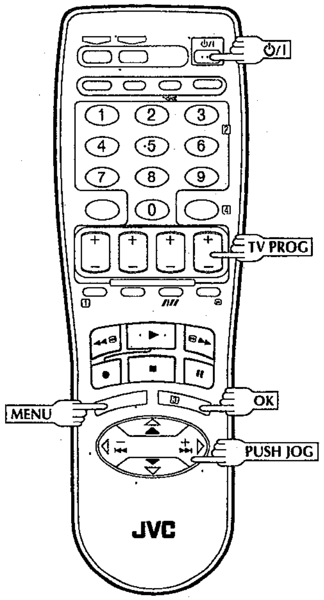
ATTENTION:
When this recorder is connected to a multi-system TV, the audio signal may not be heard or may be noisy if the colour system select switch of the TV is adjusted to the AUTO position. In such a case, set the TV's colour system select switch to the appropriate position which corresponds to the TV system you have selected at the TV System Select screen.

Tape-To-Tape Editing

There are 4 different types of recorded tape, depending on the signal recorded.


Recorded tape
Playback equipment
HR-J657MS
Dubbed tape
PAL
MESECAM
SECAM
NTSC
PAL
MESECAM
SECAM
NTSC 3.58 MHz
NTSC 4.43 MHz
PAL
MESECAM
Recording circuit
NTSC 3.58 MHz
NTSC 4.43 MHz
PAL
MESECAM
NTSC

Turn on the TV and select the VIDEO channel (or AV mode).


⏻/I
TV PROG
MENU
OK
PUSH JOG
JVC

IMPORTANT

Perform the following steps only if auto channel set has not been set correctly by Auto Set Up function (☞ pg. 6) or if you have moved to a different area or if a new station starts broadcasting in your area.

Your recorder needs to memorise all necessary stations in channel positions in order to record TV programmes. Auto Channel Set automatically assigns all receivable stations in your area so that you can call them up with the **TV PROG** buttons without going through any vacant channels.

Auto Channel Set

1 TURN ON THE RECORDER

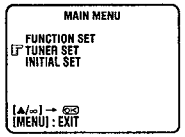
Press ⏻/I.

2 ACCESS MAIN MENU SCREEN

Press **MENU**.

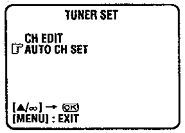
3 ACCESS TUNER SET SCREEN

Press **PUSH JOG** △▽ to place the pointer next to "TUNER SET", then press **OK** or **PUSH JOG** ▷.


MAIN MENU
FUNCTION SET
☞TUNER SET
INITIAL SET
[▲/∞] → OK
[MENU] : EXIT

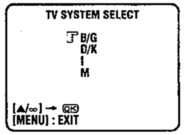
4 SELECT AUTO CH SET MODE

Press **PUSH JOG** △▽ to place the pointer next to "AUTO CH SET", then press **OK** or **PUSH JOG** ▷.

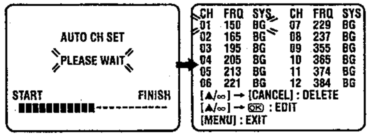

TUNER SET
CH EDIT
☞AUTO CH SET
[▲/∞] → OK
[MENU] : EXIT

5 SELECT TV SYSTEM

Press **PUSH JOG** △▽ to place the pointer next to the appropriate TV system, then press **OK** or **PUSH JOG** ▷.


TV SYSTEM SELECT
☞B/G
D/K
I
M
[▲/∞] → OK
[MENU] : EXIT

- Auto Channel Set will start.


AUTO CH SET
PLEASE WAIT
START
FINISH

CH	FRQ	SYS	CH	FRQ	SYS
01	150	BG	07	229	BG
02	165	BG	08	237	BG
03	195	BG	09	355	BG
04	205	BG	10	365	BG
05	213	BG	11	374	BG
06	221	BG	12	384	BG

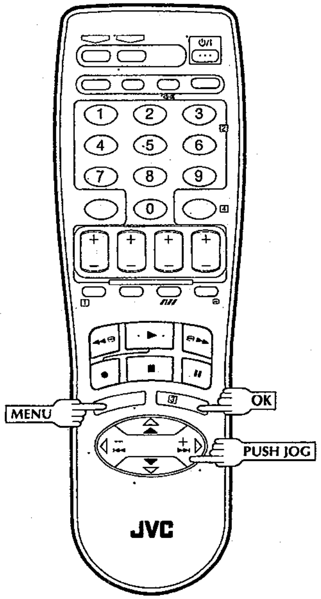
[▲/∞] → [CANCEL] : DELETE
[▲/∞] → OK : EDIT
[MENU] : EXIT

6 RETURN TO NORMAL SCREEN

Press **MENU**.

IMPORTANT

Since your video recorder memorizes all detected stations even if the reception condition is poor, some of those stored stations may produce a noisy picture. To delete those stations, ☞ "Delete A Channel" on page 32.


MENU
OK
PUSH JOG
JVC

Manual Channel Set

Store channels that were not stored during Auto Set Up (☞ pg. 6) or Auto Channel Set (☞ pg. 30).

1 ACCESS TUNER SET SCREEN

Perform steps **1** – **3** of "Auto Channel Set" on page 30.

2 ACCESS CHANNEL LIST

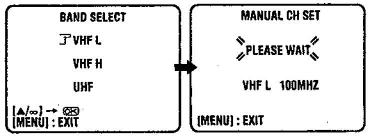
Press **PUSH JOG** △▽ to place the pointer next to "CH EDIT", then press **OK** or **PUSH JOG** ▷.

3 SELECT POSITION

Press **PUSH JOG** △▽ to place the pointer next to an open channel position, then press **OK** or **PUSH JOG** ▷.

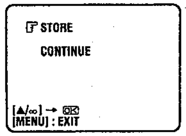
4 SELECT BAND

Press **PUSH JOG** △▽ to place the pointer next to the band of your choice, then press **OK** to initiate Manual Channel Set.


BAND SELECT
☞VHF L
VHF H
UHF
[▲/∞] → OK
[MENU] : EXIT
MANUAL CH SET
PLEASE WAIT
VHF L 100MHZ
[MENU] : EXIT

5 SET DESIRED STATION

The screen to the right appears when a station is detected.


☞STORE
CONTINUE
[▲/∞] → OK
[MENU] : EXIT

If you do not want to store the detected station...
Press **PUSH JOG** △▽ to place the pointer next to "CONTINUE", then press **OK** or **PUSH JOG** ▷.
Channel search will resume.
If you want to store the detected station...
Press **PUSH JOG** △▽ to place the pointer next to "STORE", then press **OK** or **PUSH JOG** ▷. The Channel List appears again.

- The blueback screen and the TV picture currently being broadcast appear alternately for 8 seconds each.
- If you want to store another channel, repeat steps **3** – **5**.
- When channel search completes for that band, the Band Select screen appears again. To set channels for other bands, select another band and start Manual Channel Set again (☞ step **4** and **5**).
- For fine tuning adjustment, see "Fine-Tuning Channels" on page 33.

6 RETURN TO NORMAL SCREEN

Press **MENU**.

Delete A Channel

1 ACCESS TUNER SET SCREEN

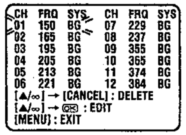
Perform steps **1** – **3** of "Auto Channel Set" on page 30.

2 ACCESS CHANNEL LIST

Press **PUSH JOG** △▽ to place the pointer next to "CH EDIT", then press **OK** or **PUSH JOG** ▷.

3 SELECT CHANNEL

Press **PUSH JOG** △▽ to until the channel you want to delete begins blinking.

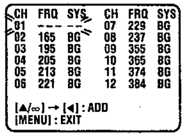


```
CH  FRQ  SYS   CH  FRQ  SYS
01  150  BG    07  229  BG
02  165  BG    08  237  BG
03  195  BG    09  355  BG
04  205  BG    10  365  BG
05  213  BG    11  374  BG
06  221  BG    12  384  BG
[▲/∞] → [CANCEL] : DELETE
[▲/∞] → OK : EDIT
[MENU] : EXIT
```

4 DELETE CHANNEL

Press **CANCEL**.

- To re-store it, simply press ◁.
- Repeat steps **3** – **4** as necessary.



```
CH  FRQ  SYS   CH  FRQ  SYS
01  ---  --    07  229  BG
02  165  BG    08  237  BG
03  195  BG    09  355  BG
04  205  BG    10  365  BG
05  213  BG    11  374  BG
06  221  BG    12  384  BG

[▲/∞] → [◀] : ADD
[MENU] : EXIT
```

5 RETURN TO NORMAL SCREEN

Press **MENU**.

Swap Channel Positions

Example: To swap CH03 and CH09.

1 ACCESS TUNER SET SCREEN

Perform steps **1** – **3** of "Auto Channel Set" on page 30.

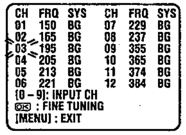
2 ACCESS CHANNEL LIST

Press **PUSH JOG** △▽ to place the pointer next to "CH EDIT", then press **OK** or **PUSH JOG** ▷.

3 SELECT POSITION (e.g. 03)

Press **PUSH JOG** △▽ until the section of CH "03" begins blinking, then press **OK** or **PUSH JOG** ▷.

- Only "03" will blink.

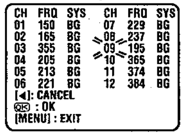


```
CH  FRQ  SYS   CH  FRQ  SYS
01  150  BG    07  229  BG
02  165  BG    08  237  BG
03  195  BG    09  355  BG
04  205  BG    10  365  BG
05  213  BG    11  374  BG
06  221  BG    12  384  BG
[0 – 9]: INPUT CH
OK : FINE TUNING
[MENU] : EXIT
```

4 SELECT POSITION (e.g. 09)

Press **NUMBER** keys to input "0" and "9".

- The two selected channels will be swapped.
- To cancel the channel swapping, press **PUSH JOG** ◁.



```
CH  FRQ  SYS   CH  FRQ  SYS
01  150  BG    07  229  BG
02  165  BG    08  237  BG
03  355  BG    09  195  BG
04  205  BG    10  365  BG
05  213  BG    11  374  BG
06  221  BG    12  384  BG
[◀]: CANCEL
OK : OK
[MENU] : EXIT
```

5 STORE NEW POSITIONS

Press **OK** or **PUSH JOG** ▷.

- Repeat steps **3** – **5** as necessary.

6 RETURN TO NORMAL SCREEN

Press **MENU**.

Fine-Tuning Channels

1 ACCESS TUNER SET SCREEN

Perform steps **1** – **3** of "Auto Channel Set" on page 30.

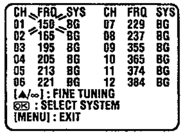
2 ACCESS CHANNEL LIST

Press **PUSH JOG** △▽ to place the pointer next to "CH EDIT", then press **OK** or **PUSH JOG** ▷.

3 SELECT CHANNEL TO FINE-TUNE

Press **PUSH JOG** △▽ until the channel you want to tune begins blinking, then press **OK** twice.

- The "FRQ" number for that channel starts blinking.



```
CH  FRQ  SYS   CH  FRQ  SYS
01  150  BG    07  229  BG
02  165  BG    08  237  BG
03  195  BG    09  355  BG
04  205  BG    10  365  BG
05  213  BG    11  374  BG
06  221  BG    12  384  BG
[▲/∞] : FINE TUNING
OK : SELECT SYSTEM
[MENU] : EXIT
```

4 PERFORM TUNING

Press **PUSH JOG** △▽ until the picture becomes clearer, then press **OK** or **PUSH JOG** ▷.

- Repeat steps **3** and **4** as necessary.

5 RETURN TO NORMAL SCREEN

Press **MENU**.

TV System Selection – When you see the picture but hear no audio

1 ACCESS TUNER SET SCREEN

Perform steps **1** – **3** of "Auto Channel Set" on page 30.

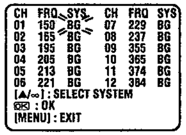
2 ACCESS CHANNEL LIST

Press **PUSH JOG** △▽ to place the pointer next to "CH EDIT", then press **OK** or **PUSH JOG** ▷.

3 SELECT CHANNEL

Press **PUSH JOG** △▽ until the channel you want to change its TV system begins blinking, then press **OK** three times.

- The "SYS" display for that channel starts blinking.



```
CH  FRQ  SYS   CH  FRQ  SYS
01  150  BG    07  229  BG
02  165  BG    08  237  BG
03  195  BG    09  355  BG
04  205  BG    10  365  BG
05  213  BG    11  374  BG
06  221  BG    12  384  BG
[▲/∞] : SELECT SYSTEM
OK : OK
[MENU] : EXIT
```

4 SELECT TV SYSTEM

Press **PUSH JOG** △▽ to select the appropriate TV system (BG → DK → I → M). Then press **OK** or **PUSH JOG** ▷.

- Repeat steps **3** and **4** as necessary.

5 RETURN TO NORMAL SCREEN

Press **MENU**.

Before requesting service for a problem, use this chart and see if you can repair the trouble yourself. Small problems are often easily corrected, and this can save you the trouble of sending your video recorder off for repair.

POWER

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. No power is applied to the recorder.	• The mains power cord is disconnected.	Connect the mains power cord.
2. The clock is functioning properly, but the recorder cannot be powered.	• "⊙" is displayed on the display panel with Auto Timer set to "OFF".	Press the **TIMER** button to turn the "⊙" indicator off.
3. The remote control won't function.	• The batteries are discharged.	Replace the dead batteries with new ones.

TAPE TRANSPORT

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. The tape does not run during recording.	• "▥" is displayed on the display panel.	Press **PLAY** to turn the "▥" indicator off.
2. The tape will not rewind or fast-forward.	• The tape is already fully rewound or fast-forwarded.	Check the cassette.

PLAYBACK

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. The playback picture does not appear while the tape is running.	• If you're using the RF OUT connection . . . . . . the TV receiver's channel selector is not set to the VIDEO channel. . . . the recorder's VIDEO channel has not been correctly set. • If you're using the AV connection, the TV receiver is not set to the AV mode.	If you are using the RF OUT connection . . . . . . set the TV receiver to the VIDEO channel. (☞ pg. 4) . . . Perform "Video Channel Set" (☞ pg. 4) If you are using the AV connection, set the TV to its AV mode.
2. Noise appears during visual search.	• This is normal.	
3. Noise appears during normal playback.	• The automatic tracking mode is engaged.	Try manual tracking. (☞ pg. 12)
4. Noise appears during slow-motion playback.	• The automatic tracking mode is engaged.	Try manual tracking. (☞ pg. 12)
5. Noise appears during still playback.		Press **TV PROG** + or – a few times to remove the noise bars from the screen.
6. Breaks are noticeable in Hi-Fi soundtrack.	• Automatic tracking is engaged.	Engage and adjust tracking manually. (☞ pg. 12)
7. The playback picture is blurred or interrupted while TV broadcasts are clear.	• The video heads may be dirty.	Consult your JVC dealer.
8. Playback picture has a loss of colour.	• The wrong colour system is selected for the tape being played back. • The wrong colour system was selected during recording.	Select the correct colour system by pressing the **COLOUR SYSTEM** button. (☞ pg. 28) Once recorded, the signal cannot be corrected. Be sure to choose the correct setting before recording.
9. No sound accompanies the playback picture.	• The TV system you have selected at the TV System Select screen is incorrect.	Set it to the correct position for the TV broadcast system used in your area. (☞ pg. 33.)

RECORDING

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Recording cannot be started.	• There is no cassette loaded, or the cassette loaded has had its Record Safety tab removed.	Insert a cassette, or using adhesive tape, reseal the slot where the tab was removed.
2. TV broadcasts cannot be recorded.	• "L-1" or "F-1" has been selected as the input mode.	Set to the desired channel.
3. Tape-to-tape editing is not possible.	• The source (another video recorder, camcorder) has not been properly connected. • All necessary power switches have not been turned on. • The input mode is not correct.	Confirm that the source is properly connected. Confirm that all units' power switches are turned on. Set the input mode to "L-1" or "F-1".
4. Camcorder recording is not possible.	• The camcorder has not been properly connected. • The input mode is not correct.	Confirm that the camcorder is properly connected. Set the input mode to "L-1" or "F-1".

TIMER RECORDING

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Timer recording won't work.	• The clock and/or the timer have been set incorrectly. • The timer is not engaged.	Re-perform the clock and/or timer settings. Press **TIMER** and confirm that "⊙" is displayed on the display panel.
2. On-screen timer programming is not possible.	• Timer recording is in progress.	Timer programming can't be performed while a timer recording is in progress. Wait until it finishes.
3. "⊙" and "📼" on the display panel won't stop blinking.	• The timer is engaged but there's no cassette loaded.	Load a cassette with the Record Safety tab intact, or cover the hole using adhesive tape.
4. The cassette is automatically ejected, and "⊙" and "📼" on the display panel won't stop blinking.	• The loaded cassette has had its Record Safety tab removed.	Remove the cassette and cover the hole with adhesive tape, or insert a cassette with the Record Safety tab intact.
5. "⊙" blinks for 10 seconds and the Timer mode is disengaged.	• **TIMER** has been pressed when there are no programs in memory, or the timer record information has been programmed incorrectly.	Check the programmed data and re-program as necessary, then press **TIMER** again.
6. The cassette is automatically ejected, the power shuts off and "⊙" and "📼" won't stop blinking.	• The end of the tape was reached during timer recording.	The programme may not have been recorded in its entirety. Next time make sure you have enough time on the tape to record the entire programme.

OTHER PROBLEMS

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Whistling or howling is heard from the TV during camcorder recording.	• The camcorder's microphone is too close to the TV. • The TV's volume is too high.	Position the camcorder so its microphone is away from the TV. Turn the TV's volume down.
2. When scanning channels, some of them are skipped over.	• Those channels have been designated to be skipped.	If you need the skipped channels, restore them (☞ pg. 31).
3. The channel cannot be changed.	• Recording is in progress.	Press **PAUSE** to pause the recording, change channels, then press **PLAY** to resume recording.
4. Channel settings that were made manually seem to have changed or disappeared.	• After the manual settings were made, Auto Channel Set was performed.	Perform manual setting again.
5. No channels are stored in the recorder's memory.	• The TV aerial cable was not connected to the recorder when Auto Set Up was performed.	Connect the TV aerial cable to the recorder properly and turn off the recorder power once, then turn the recorder power back on again. The recorder will try Auto Set Up again (☞ pg. 6).
6. "– –:– –" is displayed on the front display panel after a power outage.	• The lithium battery is exhausted.	Replace the lithium battery with a new one. (☞ pg. 5)

QUESTIONS AND ANSWERS

PLAYBACK

Q. What happens if the end of the tape is reached during playback or search?
A. The tape is automatically rewound to the beginning.

……

Q. Can the video recorder indefinitely remain in the still mode?
A. No. It stops automatically after 5 minutes to protect the heads.

……

Q. During search, slow, still and frame-by-frame playback, I can't hear any audio. What's the problem?
A. This is normal.

……

Q. When returning from multi-speed search to normal playback, the picture is disturbed. Should I be concerned about this?
A. No, it is normal.

……

Q. Noise bars appear during multi-speed search. What's the problem?
A. This is normal.

……

Q. Other than preventing further recording, what effect does removing the Record Safety tab have?
A. It disables marking of index codes.

……

Q. Sometimes, during Index Search, the video recorder can't find the programme I want to see. Why not?
A. There may be index codes too close together.

……

RECORDING

Q. When I pause and then resume a recording, the end of the recording before the pause is overlapped by the beginning of the continuation of recording. Why does this happen?
A. This is normal. It reduces distortion at the pause and resume points.

……

Q. Can the video recorder indefinitely remain in the Record-Pause mode?
A. No. The video recorder goes to its Stop mode automatically after 5 minutes to protect the heads.

……

Q. What happens if the tape runs out during recording?
A. The video recorder automatically rewinds it to the beginning.

……

TIMER RECORDING

Q. "◌" and "◷" remain lit on the display panel. Is there a problem?
A. No. This is a normal condition for a timer recording in progress.

……

Q. Can I program the timer while I'm watching a tape or a TV broadcast?
A. You won't see the picture as it is replaced by the on-screen menu, but the audio from the program or tape you're viewing can be heard.

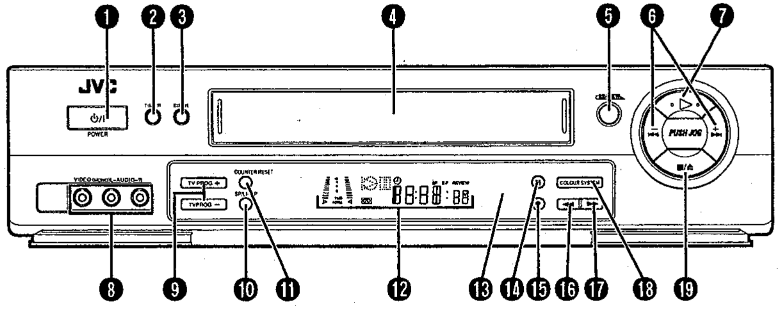
……

Q. Is it possible to timer-record a TV programme broadcast in 2000?
A. Yes, it is possible.

……

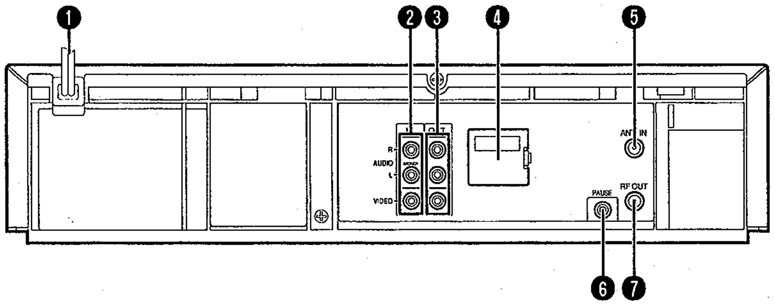
ATTENTION:
This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the recorder off and unplug the mains power cord. Then plug it in again and turn the recorder on. Take out the cassette. After checking the cassette, operate the unit as usual.

FRONT VIEW


JVC
POWER
PUSH JOG
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲

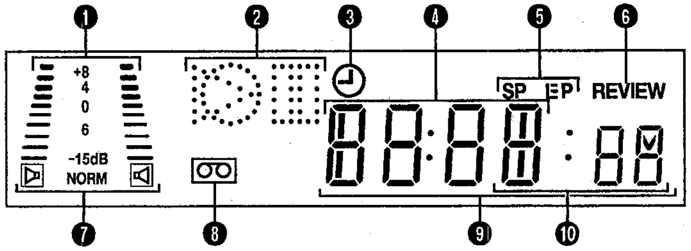
① POWER ⏻/I Button ☞ pg. 8
② TIMER Button ☞ pg. 21
③ SIMUL Button ☞ pg. 17
④ Cassette Loading Slot
⑤ REVIEW Button ☞ pg. 13
⑥ PUSH JOG ⏮ ⏭ Button ☞ pg. 11
⑦ PLAY Button ☞ pg. 10
⑧ VIDEO/AUDIO Input Connectors ☞ pg. 27
⑨ TV PROG +/– Buttons ☞ pg. 15
⑩ SP/LP/EP Button ☞ pg. 15
⑪ COUNTER RESET Button ☞ pg. 16
⑫ Display Panel ☞ pg. 39
⑬ Infrared Beam Receiving Window
⑭ PAUSE Button ☞ pg. 11
⑮ RECORD Button ☞ pg. 15
⑯ Rewind [REW] Button ☞ pg. 10, 11
⑰ Fast Forward [FF] Button ☞ pg. 10, 11
⑱ COLOUR SYSTEM Button ☞ pg. 28
⑲ STOP/EJECT Button ☞ pg. 10

REAR VIEW


ANT IN
RF OUT
PAUSE
AUDIO
VIDEO
① ② ③ ④ ⑤ ⑥ ⑦

① Mains Power Cord ☞ pg. 3
② AUDIO/VIDEO IN Connectors ☞ pg. 26
③ AUDIO/VIDEO OUT Connectors ☞ pg. 3, 26
④ Lithium Battery Compartment ☞ pg. 5
⑤ ANT. IN Connector ☞ pg. 3
⑥ Remote PAUSE Connector ☞ pg. 27
⑦ RF OUT Connector ☞ pg. 3

DISPLAY PANEL

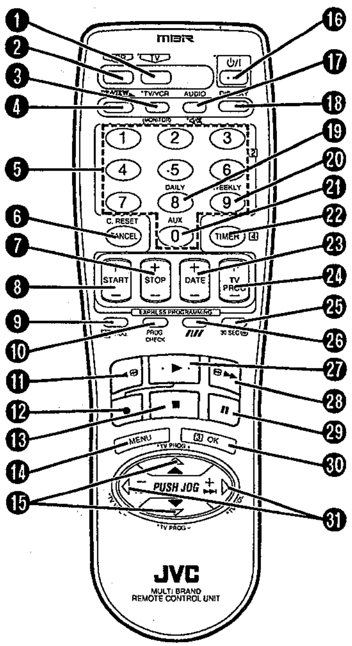

+8
4
0
6
-15dB
NORM
SP
EP
REVIEW
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① B.E.S.T. Picture System Display ☞ pg. 18
Audio Level Indicator
② Symbolic Mode Indicators

PLAY: FF/REW VARIABLE SHUTTLE SEARCH:	▷	STILL: SLOW:	▷▥
		RECORD:	○
		RECORD PAUSE:	○▥

③ "Timer" Indicator ☞ pg. 21
④ Channel Display
Clock Display
⑤ Tape Speed Indicators ☞ pg. 15
⑥ Instant REVIEW Indicator ☞ pg. 13
⑦ Audio Mode Indicator ☞ pg. 14
⑧ "Cassette Loaded" Mark
⑨ Counter Display
⑩ Mode Display (L-1 or F-1)

REMOTE CONTROL



Buttons with a small dot on the left side of the name can also be used to operate your TV ☞ pg 25.

① TV Button ☞ pg. 25
② VCR Button ☞ pg. 25
③ TV/VCR Button ☞ pg. 25
④ REVIEW Button ☞ pg. 13
⑤ NUMBER Keys ☞ pg. 15
⑥ CANCEL Button ☞ pg. 22
Counter [C.] RESET Button ☞ pg. 16
⑦ STOP +/– Button ☞ pg. 20
⑧ START +/– Button ☞ pg. 20
⑨ PROG. Button ☞ pg. 20
⑩ PROG. CHECK Button ☞ pg. 22
⑪ Rewind [REW] Button ☞ pg. 10, 11
⑫ RECORD Button ☞ pg. 15
⑬ STOP Button ☞ pg. 10
⑭ MENU Button ☞ pg. 8
⑮ PUSH JOG △▽ Button ☞ pg. 6
TV PROG +/– ☞ pg. 25
⑯ POWER ⏻/I Button ☞ pg. 8
⑰ AUDIO Button ☞ pg. 14
🔇/🔇 (TV Muting) Button ☞ pg. 25
⑱ DISPLAY Button ☞ pg. 16
⑲ DAILY Button ☞ pg. 21
⑳ WEEKLY Button ☞ pg. 21
㉑ AUX Button ☞ pg. 26
㉒ TIMER Button ☞ pg. 21
㉓ DATE +/– Button ☞ pg. 20
㉔ TV PROG +/– Button ☞ pg. 15, 20
㉕ 30 SEC Button ☞ pg. 13
㉖ Tracking Button ☞ pg. 12
SP/LP/EP Button ☞ pg. 15
㉗ PLAY Button ☞ pg. 10
㉘ Fast Forward [FF] Button ☞ pg. 10, 11
㉙ PAUSE Button ☞ pg. 11
㉚ OK Button ☞ pg. 4
㉛ PUSH JOG ◁ ▷ (⏮ ⏭) Button ☞ pg. 11, 13
TV VOL +/–Button ☞ pg. 25

How To Use

The remote control can operate most of your video recorder's functions, as well as basic functions of TV sets of JVC and other brands. ☞ pg. 25.

- Point the remote control toward the sensor window.
- The maximum operating distance of the remote control is about 8 m.

NOTES:

- *When inserting the batteries, be sure to insert in the correct directions as indicated under the battery cover.*
- *If the remote control doesn't work properly, remove its batteries, wait a short time, replace the batteries and then try again.*

ATTENTION

The remote control can operate not only the video recorder but also some of your TV's functions.

- To operate your video recorder, first press the **VCR** button to set the remote control to the Video mode.
- To operate your TV, first press the **TV** button to set the remote control to the TV mode (☞ pg. 25).

GENERAL

Power requirement	
Rating	: AC 110 – 240 V∿, 50/60 Hz
Operating	: AC 90 – 260 V∿, 50/60 Hz
Power consumption	: 22 W
Temperature	
Operating	: 5°C to 40°C
Storage	: –20°C to 60°C
Operating position	: Horizontal only
Dimensions (WxHxD)	: 400 x 94 x 340 mm
Weight	: 3.8 kg
Format	: VHS standard
Maximum recording time	
(SP)	: 240 min. with E-240 video cassette (PAL/MESECAM) : 160 min. with T-160 video cassette (NTSC)
(LP)	: 480 min. with E-240 video cassette (PAL/MESECAM)
(EP)	: 480 min. with T-160 video cassette (NTSC)

VIDEO/AUDIO

Signal system	: PAL-type colour signal and CCIR monochrome signal, 625 lines 50 fields : NTSC colour and EIA monochrome signals, 525 lines/60 fields
Recording system	: DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	: 45 dB
Horizontal resolution	: 250 lines (PAL/MESECAM) : 220 lines (NTSC)
Frequency range	: 70 Hz to 10,000 Hz (Normal audio) 20 Hz to 20,000 Hz (Hi-Fi audio)
Input/Output	: RCA connectors (IN x 2, OUT x 1)

TUNER/TIMER

TV channel storage capacity	: 99 positions (+AUX position)
Tuning system	: Frequency synthesized tuner
Channel coverage	: VHF (Low) 42 – 175 MHz (High)175 – 470 MHz UHF 470 – 870 MHz
Aerial output	: UHF channels (Adjustable E28 – E60)
Memory backup time	: Approx. 6 months Estimated figure based on supplied fresh battery; actual performance may differ.

ACCESSORIES

Provided accessories	: RF cable, Infrared remote control unit, "R6/UM-3" battery x 2, Lithium battery CR2025, Conversion plug*

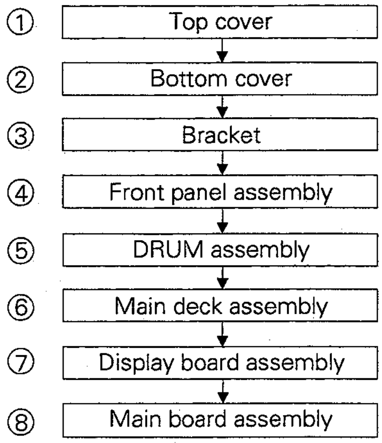
*Not provided in certain areas.

Specifications shown are for SP mode unless otherwise specified.
Design and specifications subject to change without notice.

SECTION 1
DISASSEMBLY

1.1 DISASSEMBLY FLOW CHART

This flowchart lists the disassembling steps for the cabinet parts and P.C. boards in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in reverse order. Bend, route and dress the flat cables as they were originally laid.



1.2 HOW TO READ THE DISASSEMBLY AND ASSEMBLY

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	4(S1), (S2)	
②	BOTTOM COVER	D2	(S3), 7(L1)	
③	BRACKET	D3	2(S4)	
(1)	(2)	(3)	(4)	(5)

(1) Order of steps in Procedure
When reassembling, perform the step(s) in the reverse order. These numbers are also used as the identification (location) NO. of parts Figures.
(2) Part name to be removed or installed.
(3) Fig.No. showing procedure or part location
(4) Indentification of part to be removed,unhooked,unlocked, released,unpluged,unclamped or unsoldered. P = Spring, W = Washer, S = Screw, L = Locking tab, * = Unhook,unlock, release,unplug or unsolder.
(5) Adjustment information for installation

1.3 DISASSEMBLY/ASSEMBLY METHOD

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	4(S1), (S2)	
②	BOTTOM COVER	D2	(S3), 7(L1)	
③	BRACKET	D3	2(S4)	
④	FRONT PANEL ASSEMBLY	D4	7(L2)	<NOTE 1>
⑤	DRUM ASSEMBLY	D5	3(S5),CN1,WR1, WR2,*CLEANER ASSEMBLY (L3)	<NOTE 2>
⑥	MAIN DECK ASSEMBLY	D6	2(S6),2(S7),WR3 2(L4)	<NOTE 3>
⑦	DISPLAY BOARD ASSEMBLY	D7	7(L5), *CN7001, *CN7191 REC SAFETY BOARD (L6)	<NOTE 4>
⑧	MAIN BOARD ASSEMBLY	D8	2(S8), (L7)	

<NOTE1>
- Before attaching the Front panel assembly, ensure that the door opener ⓐ is in the lowered position.

<NOTE2>
- When inserting the flat wire into the connector, be careful not to mistake the positioning of its electrodes.

<NOTE3>
- When it is required to remove the screws (S6) retaining the Main deck assembly, please refer to the "Procedures for Lowering the Cassette holder assembly"(See on pages 1-3).
- The Main deck assembly is also retained by two spacers on the Main board. Therefore, to remove the Main deck assembly, insert radio pliers or a similar tool from the main deck side and pinch the two hooks of the spacers while removing.
- When attaching the Main deck assembly, be careful not to damage the sensors and switches on the Main board (D3001: LED, Q3001: Start sensor, Q3002: End sensor).

<NOTE4>
- The REC safety board assembly is attached to the Display board assembly. It is therefore necessary to remove the REC safety board assembly before removing the Display board assembly.
- When inserting the flat wire into the connector, be careful not to mistake the positioning of its electrodes.

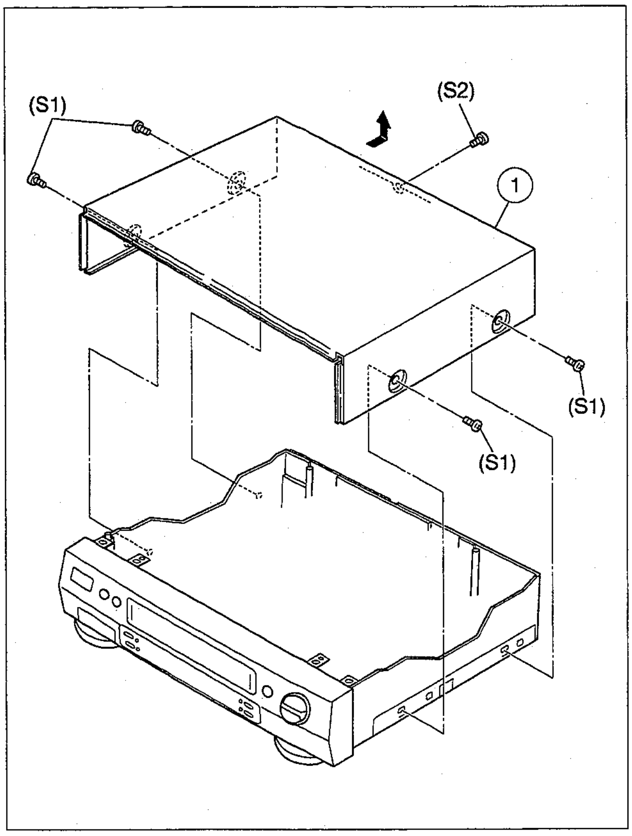


Fig. D1

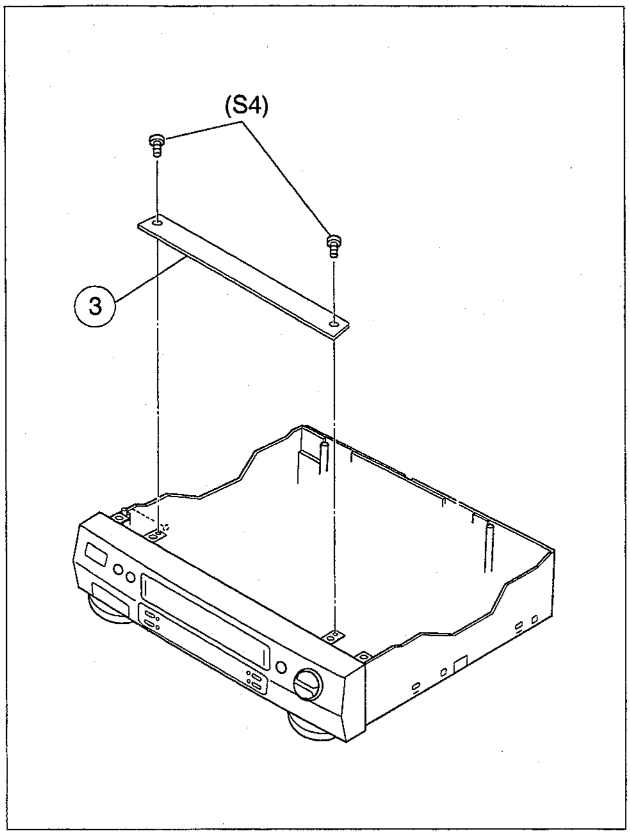


Fig. D3

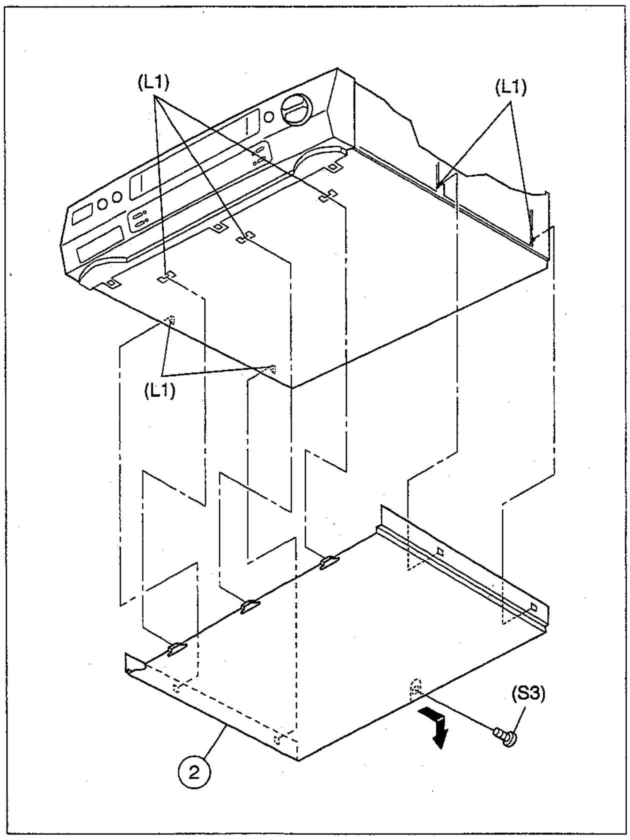


Fig. D2

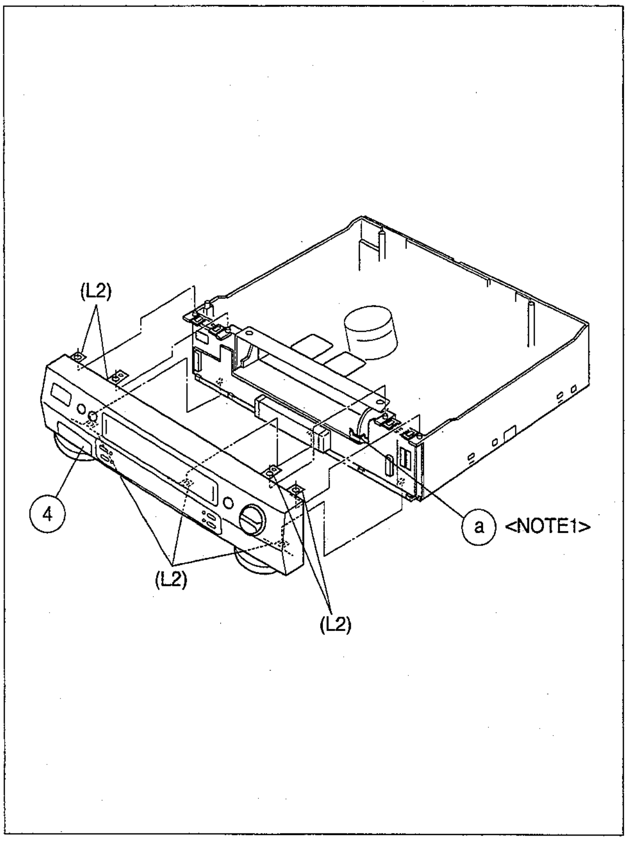
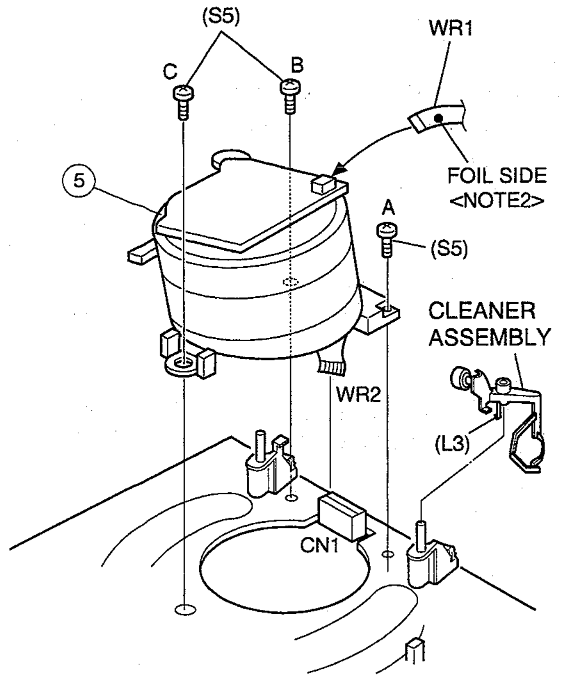


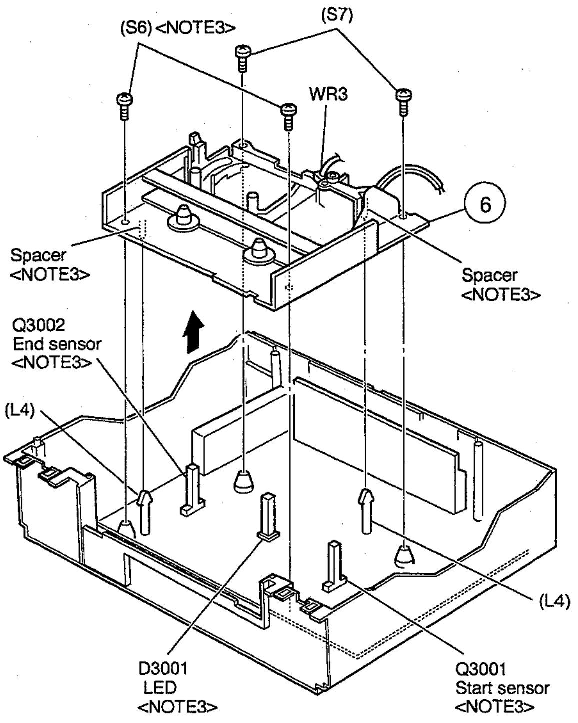
Fig. D4

NOTE : When installing the DRUM assembly, secure the screws(S5) in the order of A, B, C.



(S5)
C
B
WR1
5
FOIL SIDE
<NOTE2>
A
(S5)
CLEANER
ASSEMBLY
WR2
(L3)
CN1

Fig. D5



(S6) <NOTE3>
(S7)
WR3
6
Spacer
<NOTE3>
Spacer
<NOTE3>
Q3002
End sensor
<NOTE3>
(L4)
(L4)
D3001
LED
<NOTE3>
Q3001
Start sensor
<NOTE3>

Fig. D6

Procedures for Lowering the Cassette holder assembly

As the mechanism of this unit is integrated with the Housing assembly, the holder must be lowered and the two bolts unscrewed when removing the Main deck assembly.

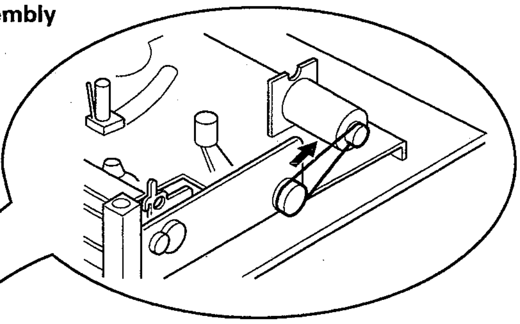


Fig. 2

Turn the loading motor pulley in the direction as indicated by Fig.2. As bothⒶandⒷlevers are lodged twice, push the levers in the direction as indicated by Fig.3 to release them. When pushing the levers, do it in the order of Ⓐ,Ⓑ,Ⓑ,Ⓐ. When the holder has been lowered, turn the pulley until the cassette holder is securely in place without allowing any up/down movement.

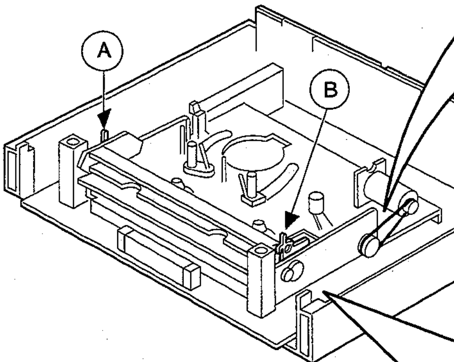


Fig. 1

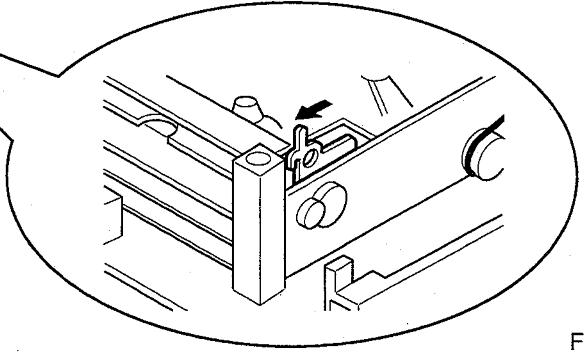


Fig. 3

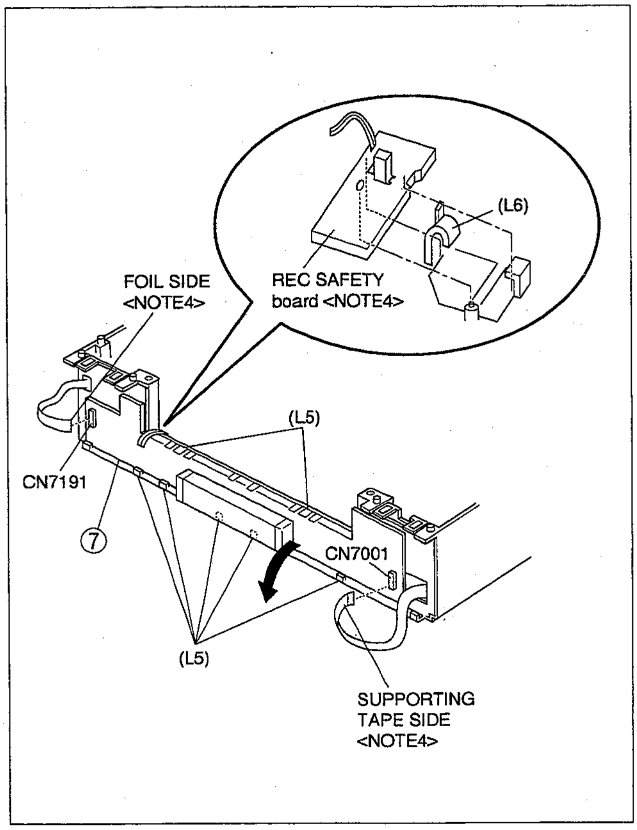


Fig. D7

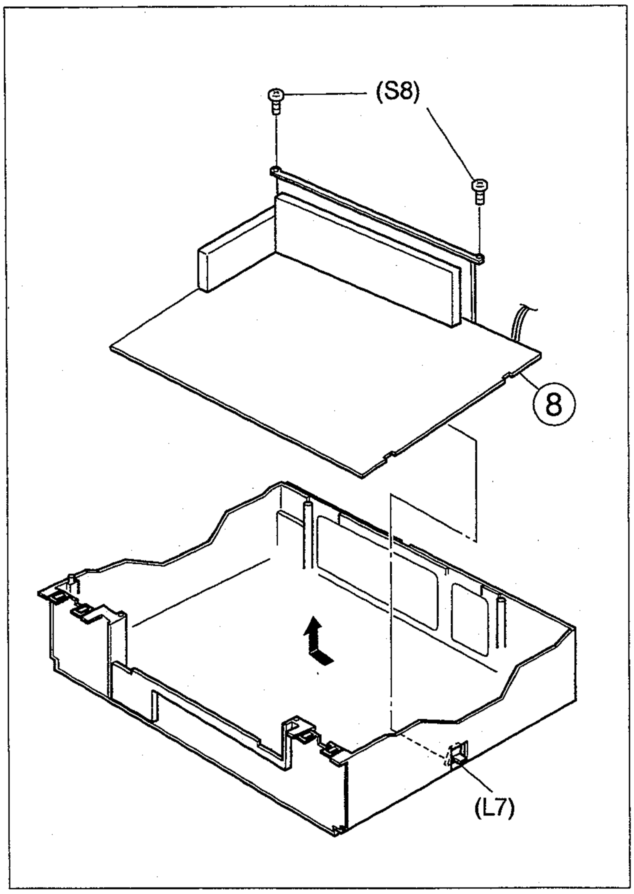


Fig. D8

1.4 SERVICE POSITION

In order to facilitate diagnosis and the repair of the Main deck assembly, this unit is constructed so as to allow the Main deck and the Main board assemblies to be removed together from the Chassis assembly.

1.4.1 How to take out the Mechanism and Main board assemblies

(1) Remove the Top cover, Bracket and Front panel assembly. (See 1.3 DISASSEMBLY/ASSEMBLY METHOD. Take care not to pull the drum wire (Fig.D5) from CN1).

(2) Lower the cassette holder, and make the preparations required in order to remove the screws from the Main deck assembly (Refer to the "Procedures for Lowering the Cassette holder assembly" on pages 1-3 of 1.3 DISASSEMBLY/ASSEMBLY METHOD).

(3) Take out 2 screws Ⓐ and 2 screws Ⓑ as shown in Fig. 1-4-1.

(4) Remove the flat wires from CN7162 and CN3005 on the Main board assembly.

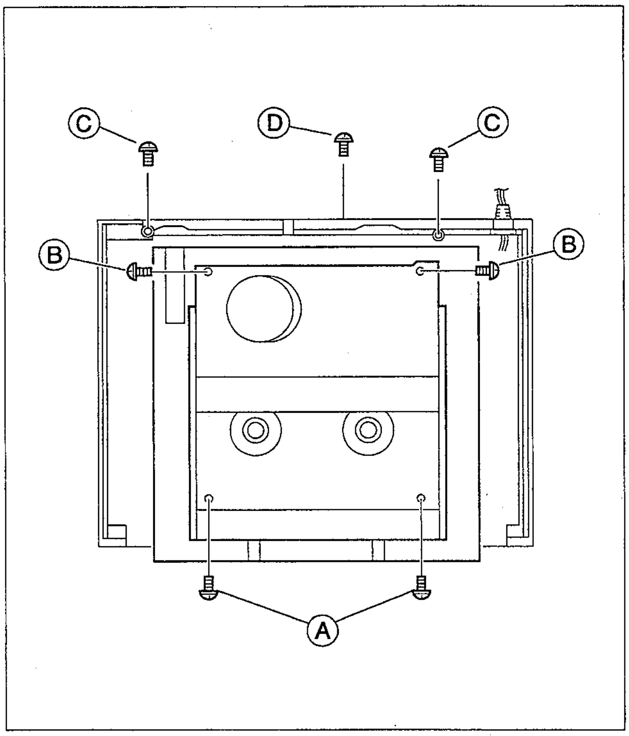


Fig. 1-4-1

(5) Take out 2 screws Ⓒ and take out 1 screw Ⓓ to install the Bottom cover (See Fig. 1-4-1).

(6) Remove the hook Ⓔ while holding the edge of the Main board, and remove the Main board and Main deck assemblies together. At this stage be careful of the power cord and prongs of the jacks on the back side (See Fig. 1-4-2).

(7) Remove the Display board and the REC safety board assemblies (See 1.3 DISASSEMBLY/ASSEMBLY METHOD), then place them on the front side of the Main deck and the Main board assemblies which have been disassembled by procedure (6), and insert the flat wires into CN7162 and CN3005 of the Main board assembly (see Fig.1-4-3).

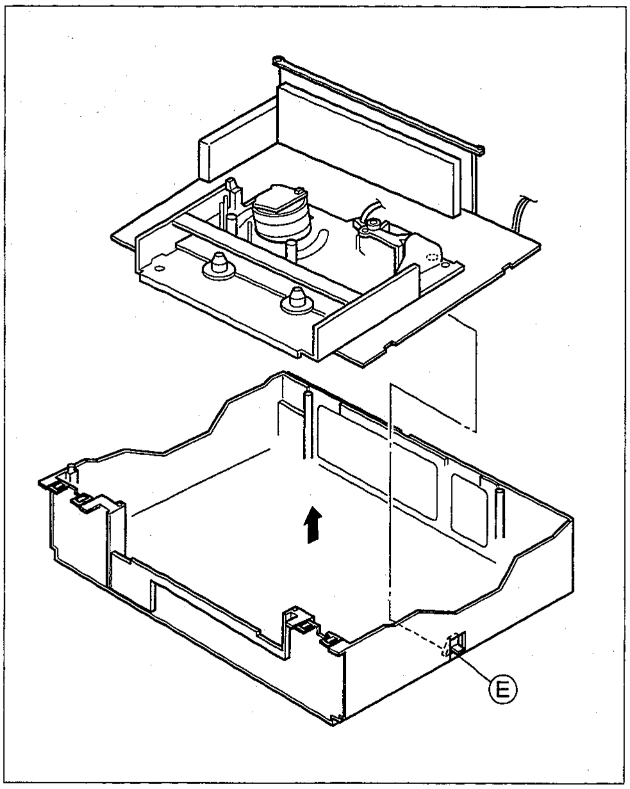


Fig. 1-4-2

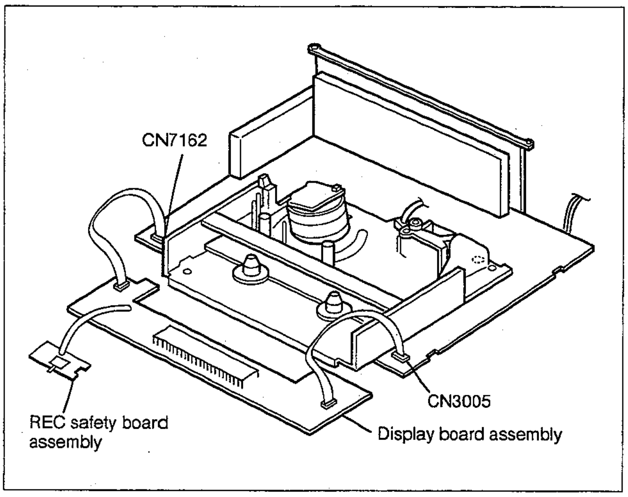


Fig. 1-4-3

(8) Plug the power cord into an AC outlet, and lift the cassette holder.
(Before turning on the power make sure that there is nothing which may produce a short circuit, such as faulty soldering.)

1.4.2 Precautions for cassette loading in the "SERVICE POSITION"

The REC safety board assembly detects cassette loading as well as cassette tabs. Therefore, after the assembly has been removed in the "SERVICE POSITION", it is required to set the switch manually on the REC safety board assembly when a cassette is loaded.

1.4.3 Cassette loading and ejection methods in the "SERVICE POSITION"(See Fig. 1-4-3).

(1) Insert a cassette halfway in the Cassette holder assembly.
(2) Set the switch on the REC safety board assembly to ON (by pressing the switch).
(3) As soon as the cassette starts to be loaded, set the switch on the REC safety board assembly to OFF (by releasing the switch).
(4) Now the desired operation (recording, playback, fast forward, rewind, etc.) is possible in this status (the status shown in Fig.1-4-3).

NOTES:
- *When performing diagnostics of the tape playback or the recording condition in the "SERVICE POSITION", enter the desired mode before turning the set upside down, and do not change the mode when performing diagnostics while the set is placed upside down. If you want to switch the mode, turn the set to the normal position (the status shown in Fig.1-4-3).*
- *In the "SERVICE POSITION", the cassette tabs cannot be detected and recording becomes possible even with a cassette with broken tabs such as the alignment tape. Be very careful not to erase important tapes.*

(5) The switch on the REC safety board assembly does not have to be operated when ejecting a tape. But be sure to turn the set to the normal position before ejecting the tape.

1.5 MECHANISM SERVICE MODE

This model has a unique function to enter the mechanism into every operation mode without loading of any cassette tape. This function is called the "MECHANISM SERVICE MODE".

1.5.1 How to set the "MECHANISM SERVICE MODE"

(1) Unplug the power cord from an AC outlet.
(2) Connect TPGND and TP7001 (TEST) on the Display board assembly using a jumper wire.
(3) Plug the power cord into an AC outlet.
(4) Set the power switch to ON.
(5) With lock levers ⒶⒷ on the left and right sides of the Cassette holder assembly are pulled toward the front, slide the holder in the same direction as the cassette insertion direction. (For the positions of lock levers ⒶⒷ, refer to the "Procedures for Lowering the Cassette holder assembly" on pages 1-3 of 1.3 DISASSEMBLY/ASSEMBLY METHOD.)
(6) The cassette holder lowers and, when the loading has completed, the mechanism enters the desired mode.

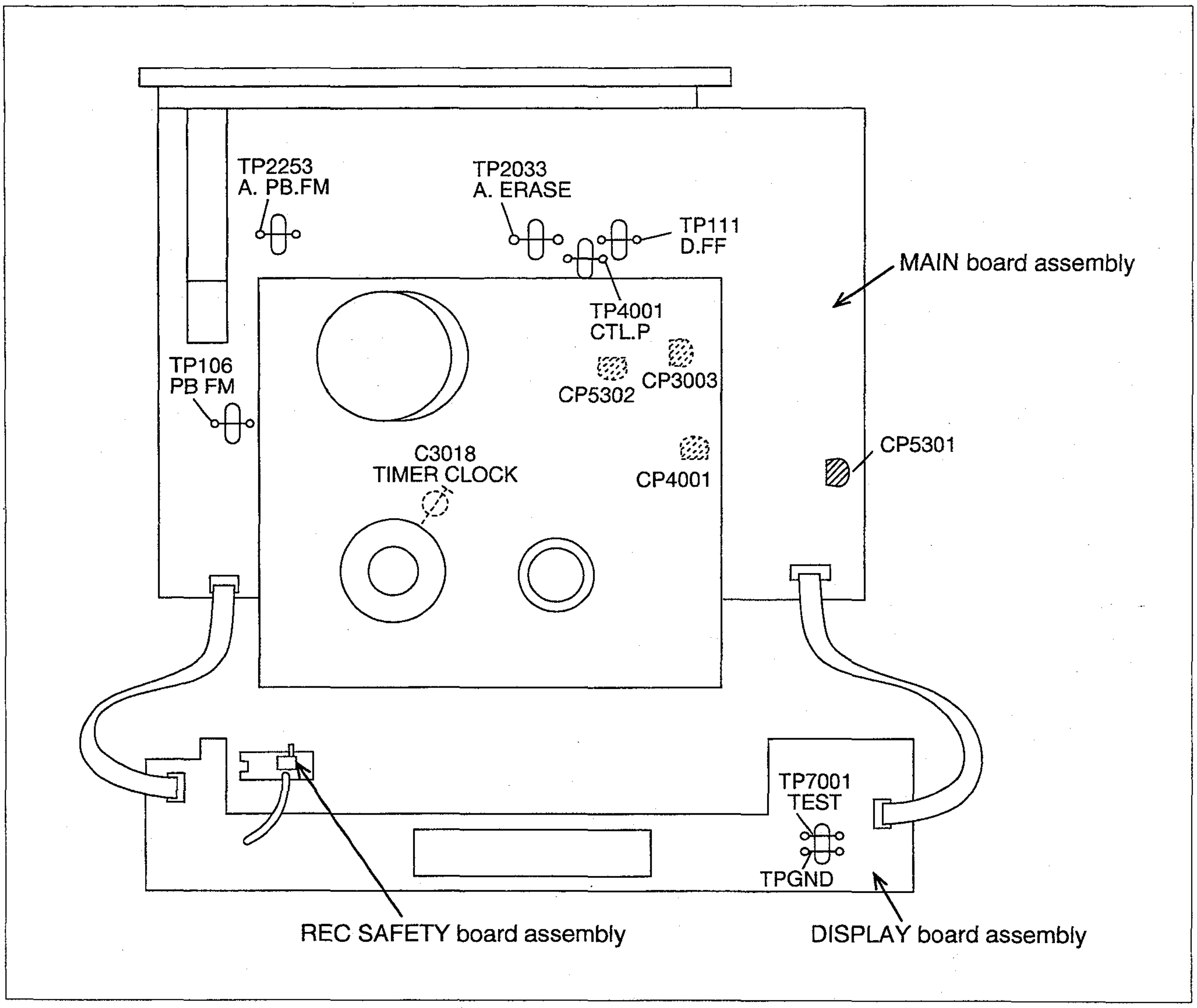

TP2253
A. PB.FM
TP2033
A. ERASE
TP111
D.FF
MAIN board assembly
TP4001
CTL.P
TP106
PB FM
CP5302
CP3003
C3018
TIMER CLOCK
CP4001
CP5301
TP7001
TEST
TPGND
REC SAFETY board assembly
DISPLAY board assembly

Fig. 1-5-1

1.6 EMERGENCY DISPLAY FUNCTION

This product has the function to store the last two previous emergency faults which can be displayed in the FDP when servicing.

1.6.1 How to display record of an emergency faults

Note: *Put the unit into A mode by using the VCR remote control. (When it is in B mode, the preset remote control codes are not accepted.)*

(1) Press "N" button of the presetting unit more than 2 seconds and the two previous emergency faults are shown in the LED or FDP.
(2) Press "N" button of the presetting unit again to return to the normal mode.

```
[Example]   E : 01 : 03
                 ▲    ▲
                 │    └── Emergency fault before last
                 └─────── Emergency fault of the last
                          time

[Example]   E : — — : — —  ◄── No record of emergency
```

1.6.3 How to clear emergency record

Press the COUNTER RESET button on the remote controller in the emergency record display mode, and the record of the emergency fault(s) is cleared.

1.6.2 Detail of emergency faults

EMG DATA	Symptom	Detect mode	Resulting mode
E : 01	Loading motor rotates for more than 8 Sec without shift to next mode.	Loading	POWER OFF
E : 02	Loading motor rotates for more than 8 Sec without shift to next mode.	Unloading	POWER OFF
E : 03	TU REEL FG input is absent. (for more than 4 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 04	DRUM FF input is absent. (for more than 3 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 06	CAPSTAN FG input is absent. (for more than 4 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 07	No SWD5V/12V	POWER ON	POWER OFF

Table 1-6-1 EMERGENCY FAULTS

1.7 SYSCON CIRCUIT

1.7.1 Syscon CPU pin function (IC3001) 1/2

PIN NO.	LABEL	IN/OUT	NOTE
1	IND(L)	-	NC
2	IND(R)	-	NC
3	PERI 1S	IN	INPUT FOR THE TERMINAL SLID SW POSI IN THE SAT MODE
4	INDEX	IN/OUT	DETECTION SIGNAL FOR SERVO INDEX
5	AVSS	-	GND FOR ANALOG CIRCUIT
6	TEST	-	GND
7	X2	-	TIMER CLOCK (32.768 KHz)
8	X1	-	TIMER CLOCK (32.768 KHz)
9	VSS	-	GND
10	OSC1	-	MAIN SYSTEM CLOCK (10 MHz)
11	OSC2	-	MAIN SYSTEM CLOCK (10 MHz)
12	RESET	-	RESET TERMINAL (RESET ON:L)
13	(NMI)	-	NC
14	PS SECAM(H)	IN	NC
15	LOCK(L)	IN	(TUNING PLL LOCK DETECT:L)
16	SYNC DET	IN	DETECTION OF VIDEO SYNC SIGNAL (DETECTED:H)
17	PWER DOWN	IN	DETECTION SIGNAL FOR POWER DOWN
18	SQ REC(L)	-	NC
19	P.MUTE(L)	OUT	PICTURE MUTE CONTROL (MUTE:L)
20	R.PAUSE	IN	REMOTE PAUSE CONTROL
21	SECAM DET	-	NC
22	NC	-	NC
23	A.WIDE	-	NC
24	A.EFFECT	-	NC
25	A.MUTE	OUT	AUDIO MUTE CONTROL (MUTE ON:H)
26	TS BUSY	-	NC
27	TS CS	-	NC
28	TM CLOCK	OUT	CLOCK SIGNAL ON THE BUS LINE FROM TIMER TO M-CTL
29	TM CS	OUT	CHIP SELECT SIGNAL ON THE BUS LINE FROM TIMER TO M-CTL
30	TM BUSY	IN	BUSY SIGNAL ON THE BUS LINE FROM TIMER TO M-CTL
31	TM DATA0	IN/OUT	DATA ON THE BUS LINE
32	TM DATA1	IN/OUT	DATA ON THE BUS LINE
33	TM DATA2	IN/OUT	DATA ON THE BUS LINE
34	TM DATA3	IN/OUT	DATA ON THE BUS LINE
35	TM DATA4	IN/OUT	DATA ON THE BUS LINE
36	TM DATA5	IN/OUT	DATA ON THE BUS LINE
37	TM DATA6	IN/OUT	DATA ON THE BUS LINE
38	TM DATA7	IN/OUT	DATA ON THE BUS LINE
39	H.REC(H)	OUT	HIFI AUDIO REC MODE CONTROL SIGNAL (REC:H)
40	N.REC(H)	OUT	NORMAL AUDIO REC MODE CONTROL SIGNAL(REC:H)

Table 1-7-1 SYSCON CPU pin function(1/2)

1.7.2 Syscon CPU pin function (IC3001) 2/2

PIN NO.	LABEL	IN/OUT	NOTE
41	MS_RESET	OUT	RESET SIGNAL FOR THE MECHANISM CONTROL IC(IC3301)
42	CNR_ON(H)	-	NC
43	TU DATA	OUT	TUNING DATA
44	D.MUTE(H)	-	NC
45	SECAM TU ON(L)	OUT	TUNER "L" SYSTEM MODE:H
46	TU CE	OUT	CHIP ENABLE OF THE TUNER UNIT
47	TU CLOCK	OUT	CLOCK FOR DATA TRANSFER TO THE TUNER UNIT
48	DK(H)/FORCE(L)	-	NC
49	SECAM VL(H)	OUT	TUNER SYSTEM "L" MODE : L
50	RCIN	IN	DATA INPUT OF THE REMOTE CONTROL UNIT
51	NTSC(H)	-	NC
52	FULL_E_ON	-	NC
53	V.SYNC	IN	INPUT FOR THE VIDEO SYNC
54	P.SAVE(L)	-	NC
55	CCIR(L)	OUT	EXCEPT FOR NTSC:L
56	OSD CS	OUT	CHIP SELECT FOR THE ON-SCREEN IC
57	S2-OUT	OUT	SERIAL DATA TRANSFER OUTPUT FROM THE FDP DRIVER TO THE ON-SCREEN IC
58	S2-IN	IN	SERIAL DATA TRANSFER OUTPUT FROM THE ON-SCREEN IC TO FDP DRIVER
59	S2-CLK	OUT	SERIAL DATA TRANSMISSION CLOCK FROM THE FDP DRIVER TO THE ON-SCREEN IC
60	INSERT(L)	-	NC
61	STB	OUT	PERMISSION SIGNAL FOR CLOCK OUTPUT (STROBE SIGNAL)
62	SPH/PSL	-	NC
63	VCC	-	SYSTEM POWER
64	SEC TR(H)	-	NC
65	TITLE REC	-	NC
66	NC	-	NC
67	CTL_CLOCK	IN	LINEAR TIME COUNTER INPUT
68	SECAM(H)	-	NC
69	I2C DATA	IN/OUT	SERIAL DATA TRANSFER OUTPUT FOR EE PROM
70	I2C CLOCK	IN/OUT	SERIAL DATA TRANSMISSION CLOCK FOR EE PROM
71	D.FF	IN	ROTATION DETECTION SIGNAL FOR DRUM MOTOR/TIMING CONTROL SIGNAL FOR REC
72	AVCC	-	SYSTEM POWER FOR ANALOG CIRCUIT
73	SHTLB	-	NC
74	SHTL(L)/SHTLA	-	NC
75	JSA	-	NC
76	JSB	-	NC
77	RF AGC	-	NC
78	REC LEVEL V	-	NC
79	AFT/S.CURVE	IN	TUNING CHECK
80	SCRAMBLE(H)	-	NC

Table 1-7-2 SYSCON CPU pin function(2/2)

1.7.3 Syscon CPU pin function (IC3301) 1/2

PIN NO.	LABEL	IN/OUT	NOTE
1	A.ENV/ND(L)	IN	INPUT THE AVERAGE OF FMA PLAYBACK SIGNAL-A (AUTO TRACKING AND FMA NON-RECORD DETECTION)
2	VIDEO ENV	IN	AUTO TRACKING DETECT/INPUT THE AVERAGE OF PLAYBACK VIDEO SIGNAL
3	6.5H DET	IN	6.5H DETECTION SIGNAL FOR SERVO CIRCUIT
4	REC SF	IN	DETECTION SIGNAL FOR REC SAFETY/CASSETTE INSERT SWITCH
5	AVSS	-	GND FOR ANALOG CIRCUIT
6	TEST	-	GND
7	X2	-	NC
8	X1	-	NC
9	VSS	-	GND
10	OSC1	-	MAIN SYSTEM CLOCK (10 MHz)
11	OSC2	-	MAIN SYSTEM CLOCK (10 MHz)
12	MS_RESET	-	RESET TERMINAL (RESET ON:L)
13	(NMI)	-	NC
14	LSC	IN	MECHANISM MODE DETECT SWITCH (C)
15	LSB	IN	MECHANISM MODE DETECT SWITCH (B)
16	LSA	IN	MECHANISM MODE DETECT SWITCH (A)
17	RAE OUT	-	NC
18	C/M E06	OUT	SPEED CONTROL FOR CAP MOTOR
19	S.SENS	IN	START SENSOR
20	E.SENS	IN	END SENSOR
21	I2C CLOCK	OUT	SERIAL DATA TRANSFER CLOCK FOR MEMORY IC
22	TU FG	IN	DETECTION SIGNAL FOR TAKE-UP REEL ROTATION/TAPE REMAIN
23	SUP FG	IN	DETECTION SIGNAL FOR SUPPLY REEL ROTATION/TAPE REMAIN
24	CTL CLOCK	IN	CONTROL PULSE INPUT
25	I2C DATA	IN/OUT	I/O DATA FOR MEMORY IC
26	LCM1	OUT	MODE MOTOR DRIVE CONTROL
27	LCM2	OUT	MODE MOTOR DRIVE CONTROL
28	LCM3	OUT	MODE MOTOR DRIVE CONTROL
29	TM CS	IN	CHIP SELECT SIGNAL ON THE BUS LINE FROM TIMER TO M-CTL
30	TM CLOCK	IN	CLOCK SIGNAL ON THE BUS LINE FROM TIMER TO M-CTL
31	SLOW P/PAL_EP_CTL	OUT	MEMORY TIMING CONTROL IN THE SLOW MODE
32	LP SHORT(H)	-	NC
33	SP SHORT(H)	-	NC
34	TM DATA7	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL
35	TM DATA6	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL
36	TM DATA5	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL
37	TM DATA4	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL
38	TM DATA3	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL
39	TM DATA2	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL
40	TM DATA1	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL

Table 1-7-3 SYSCON CPU pin function(1/2)

1.7.4 Syscon CPU pin function (IC3301) 2/2

PIN NO.	LABEL	IN/OUT	NOTE
41	TM DATA0	IN/OUT	DATA ON THE BUS LINE FROM TIMER TO M-CTL
42	TM BUSY	OUT	BUSY SIGNAL ON THE BUS LINE FROM TIMER TO M-CTL
43	N REC START(H)	OUT	NORMAL AUDIO SOUND RECORDING START
44	H REC START(L)	OUT	HIFI AUDIO SOUND RECORDING START
45	VPCTL	OUT	"V.PULSE CONTROL, V COMPENSATION DURING SPECIAL PLAYBACK"
46	P.CTL(H)	OUT	CONTROL SIGNAL FOR SW POWER SUPPLY
47	EE(L)	-	NC
48	FLY E ON(H)	-	NC
49	VSC CLOCK	-	NC
50	VSC DATA	-	NC
51	RY-REV(L)	-	NC
52	CTL C/D	IN	DETECTION SIGNAL FOR CONTROL PULSE MODE/TAPE RUNNING/BLANK
53	DDFG	-	NC
54	DDSPDCTL	-	NC
55	DDCREV	-	NC
56	DDCFWD	-	NC
57	VIDEO DATA	-	NC
58	SP(L)	-	NC
59	VIDEO CLK	-	NC
60	E.P.CTL/IP ON(H)	-	NC
61	V.UP(H)	-	NC
62	TRICK	-	NC
63	VCC	-	SYSTEM POWER
64	SLOW_REV	-	NC
65	1/2_EP/3.58NTSC	-	NC
66	S_DATA	OUT	SERVO SERIAL DATA OUTPUT
67	CAP REV(L)	OUT	CAPSTAN MOTOR REVERSE CONTROL (FWD:H/REV:L)
68	DUTY I/O	IN/OUT	DETECTION SIGNAL FOR INDEX DATA
69	CAP FG	IN	DETECTION SIGNAL FOR MODE/TAPE RUNNING/BLANK
70	PAUSE(L)	OUT	STOP CONTROL SIGNAL FOR CAPSTAN MOTOR
71	D.FF	IN	ROTATION DETECTION SIGNAL FOR DRUM MOTOR/TIMING CONTROL SIGNAL FOR REC
72	AVCC	-	SYSTEM POWER FOR ANALOG CIRCUIT
73	SCASS	-	NC
74	SB-G	OUT	VOLTAGE CONTROL SIGNAL FOR VIDEO FREQUENCY RESPONSE
75	DRUM V	OUT	VOLTAGE CONTROL SIGNAL FOR DRUM MOTOR DRIVE
76	CAP V	OUT	VOLTAGE CONTROL SIGNAL FOR CAPSTAN MOTOR SPEED
77	DD ABS	-	NC
78	S(H)	OUT	S-VHS MODE:H
79	HEAD.SEL	-	NC
80	PROTECT	IN	DETECTION SIGNAL FOR SW POWER SUPPLY

Table 1-7-4 SYSCON CPU pin function(2/2)

SECTION 2
MECHANISM ADJUSTMENT

2.1 BEFORE STARTING REPAIR AND ADJUSTMENT

2.1.1 Precautions

(1) Unplug the power cable of the main unit before using your soldering iron.
(2) Take care not to cause any damage to the conductor wires when plugging and unplugging the connectors.
(3) Do not randomly handle the parts without identifying where the trouble is.
(4) Exercise enough care not to hurt yourself, especially your finger nails, during the repair work.
(5) When installing the front panel assembly, be sure to hook the lug on the back side of cassette door to the door opener of the cassette holder. If this operation is neglected it will not be possible to remove the cassette when ejecting because the housing door cannot be opened.

2.1.2 Checking for Proper Mechanical Operations

Enter the mechanism service mode when you want to operate the mechanism when no cassette is loaded. (See 1.5 MECHANISM SERVICE MODE)

2.1.3 Manually Removing the Cassette Tape

1. In case of electrical failures

If you cannot remove the cassette tape which is loaded because of any electrical failure, manually remove it by taking the following steps.

(1) Unplug the power cable and remove the top cover, bracket and front panel assembly. (See 1.3 DISASSEMBLY/ASSEMBLY METHOD)
(2) Unload the cassette by manually turning the unloading motor of the main deck assembly toward the front. In doing so, hold the tape by the hand to keep the slack away from any grease. (See Fig.2-1-1)
(3) Bring the pole base assembly (on the supply or take-up side) to a pause when it reaches the position where it is hidden behind the cassette tape.
(4) Move the top plate toward the drum while holding down the lug Ⓐ of the bracket retaining the top plate. Likewise hold part Ⓑ down and remove the top plate.
The spring plate Ⓒ is then brought under the cassette lid. Then remove the top plate by pressing the whole cassette tape down. (Note 1) (See Fig.2-1-2).
(5) Remove the cassette tape by holding both the slackened tape and the cassette lid.
(6) Take up the slack of the tape into the cassette. This completes removal of the cassette tape.

Note: *The spring plate of the top plate is sharp-edged. Take care not to hurt yourself.*

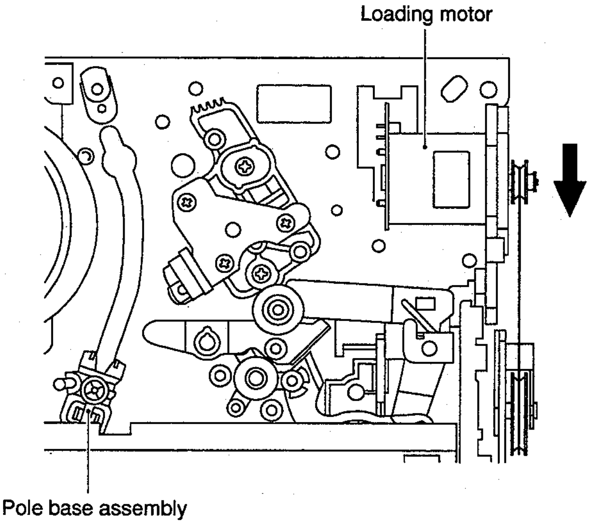


Fig. 2-1-1

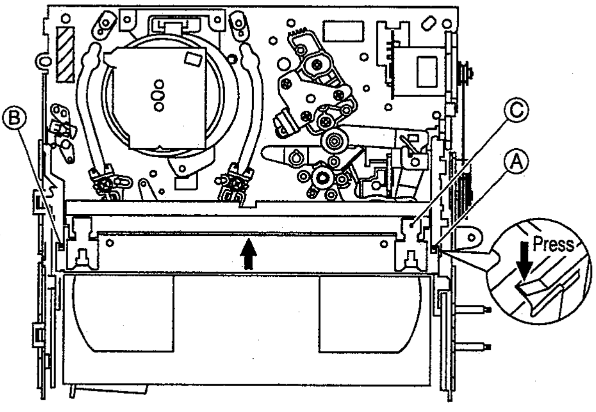


Fig. 2-1-2

2. In case of mechanical failure

If you cannot remove the cassette tape which is loaded because of any mechanical failure, manually remove it by taking the following steps.

(1) Unplug the power cable and remove the top cover, bracket and front panel assembly (See 1.3 DISASSEMBLY/ASSEMBLY METHOD).

(2) While keeping the tension arm of the main deck assembly free from tension, pull the tape on the pole base assembly out of the guide roller (on the supply or take-up side) (See Fig.2-1-3).

(3) Remove the top plate as done in Step (4) of "1 In case of electrical failures" and remove the guide pole cap at the same time. (See Fig.2-1-4).

(4) While lifting the cassette tape lid, hold the cassette tape case and pinch roller by the fingers and move them toward the loading motor to relieve pressure on the tape. Then remove the tape while taking the cassette case out of the cassette holder. (See Fig.2-1-4).

(5) Re-place the guide pole cap and take up the slack of the tape into the cassette.

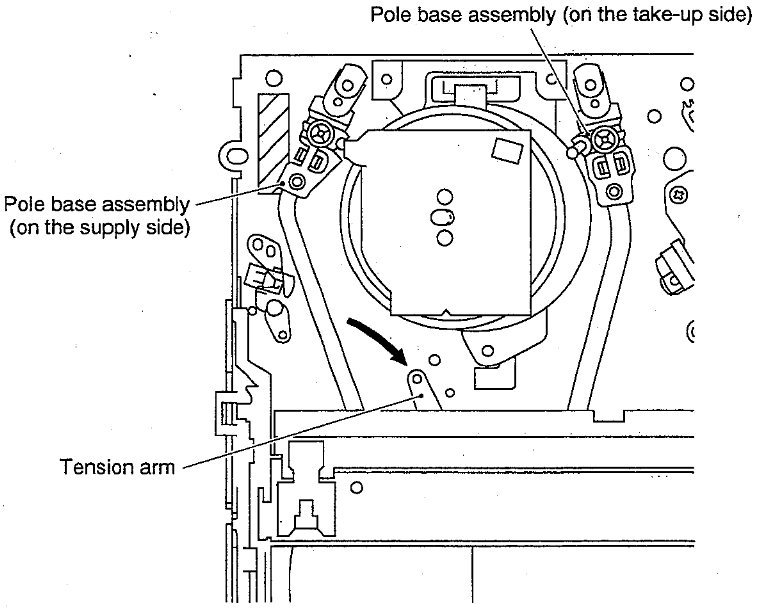

Pole base assembly (on the take-up side)
Pole base assembly (on the supply side)
Tension arm

Fig. 2-1-3

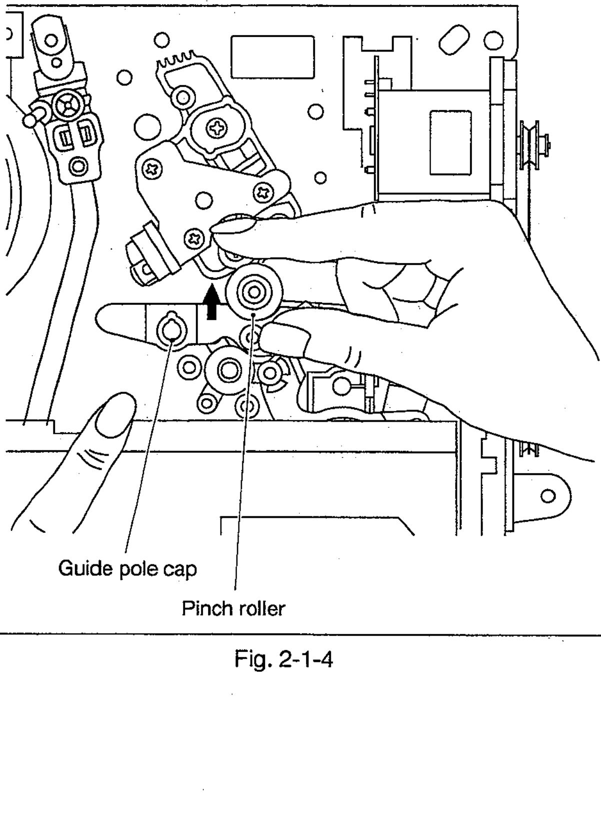

Guide pole cap
Pinch roller

Fig. 2-1-4

2.1.4 Jigs and Tools Required for Adjustment

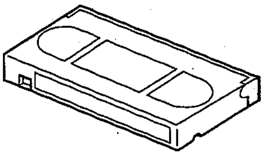
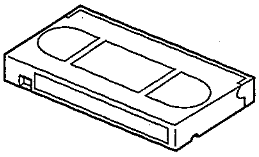
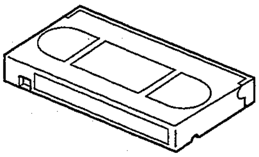
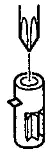
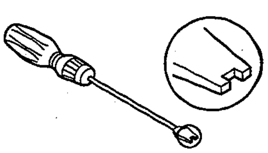
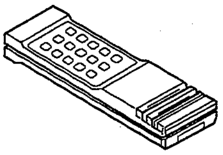
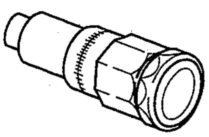
Alignment tape (SP) MHPE	Alignment tape (LP) MHPE-L	Back tension cassette gauge PUJ48076-2	A/C head position bit PTU94010
			
Roller driver PTU94002	Presetting unit PTU94008	Torque gauge PUJ48075-2	
			

Table 2-1-1 Jigs and tools required for adjustment

2.1.5 Maintenance and Inspection

1. Location of major mechanical parts

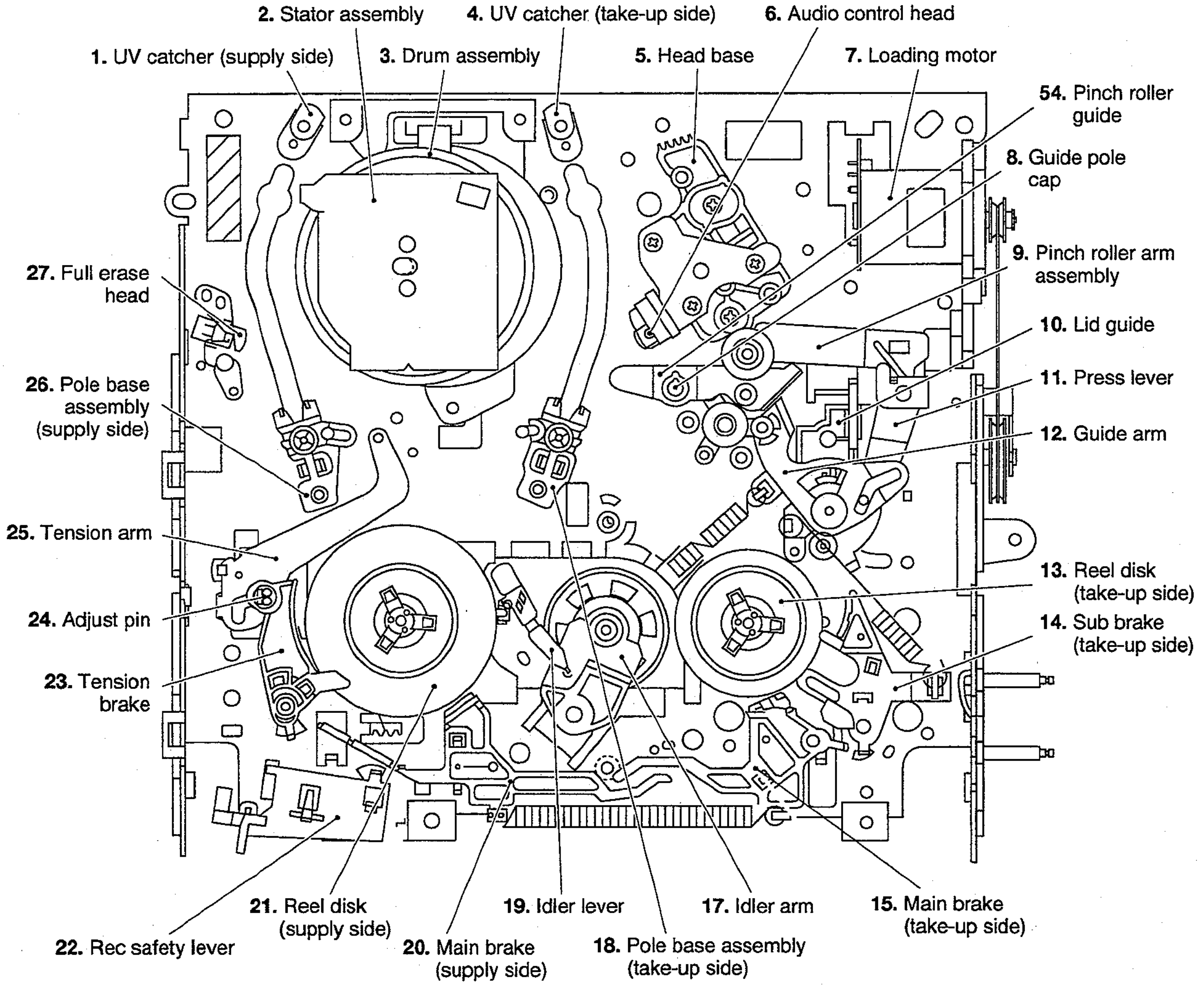

2. Stator assembly
4. UV catcher (take-up side)
6. Audio control head
1. UV catcher (supply side)
3. Drum assembly
5. Head base
7. Loading motor
54. Pinch roller guide
8. Guide pole cap
9. Pinch roller arm assembly
10. Lid guide
11. Press lever
12. Guide arm
13. Reel disk (take-up side)
14. Sub brake (take-up side)
27. Full erase head
26. Pole base assembly (supply side)
25. Tension arm
24. Adjust pin
23. Tension brake
21. Reel disk (supply side)
22. Rec safety lever
20. Main brake (supply side)
19. Idler lever
18. Pole base assembly (take-up side)
17. Idler arm
15. Main brake (take-up side)

Fig. 2-1-5 Main deck top side

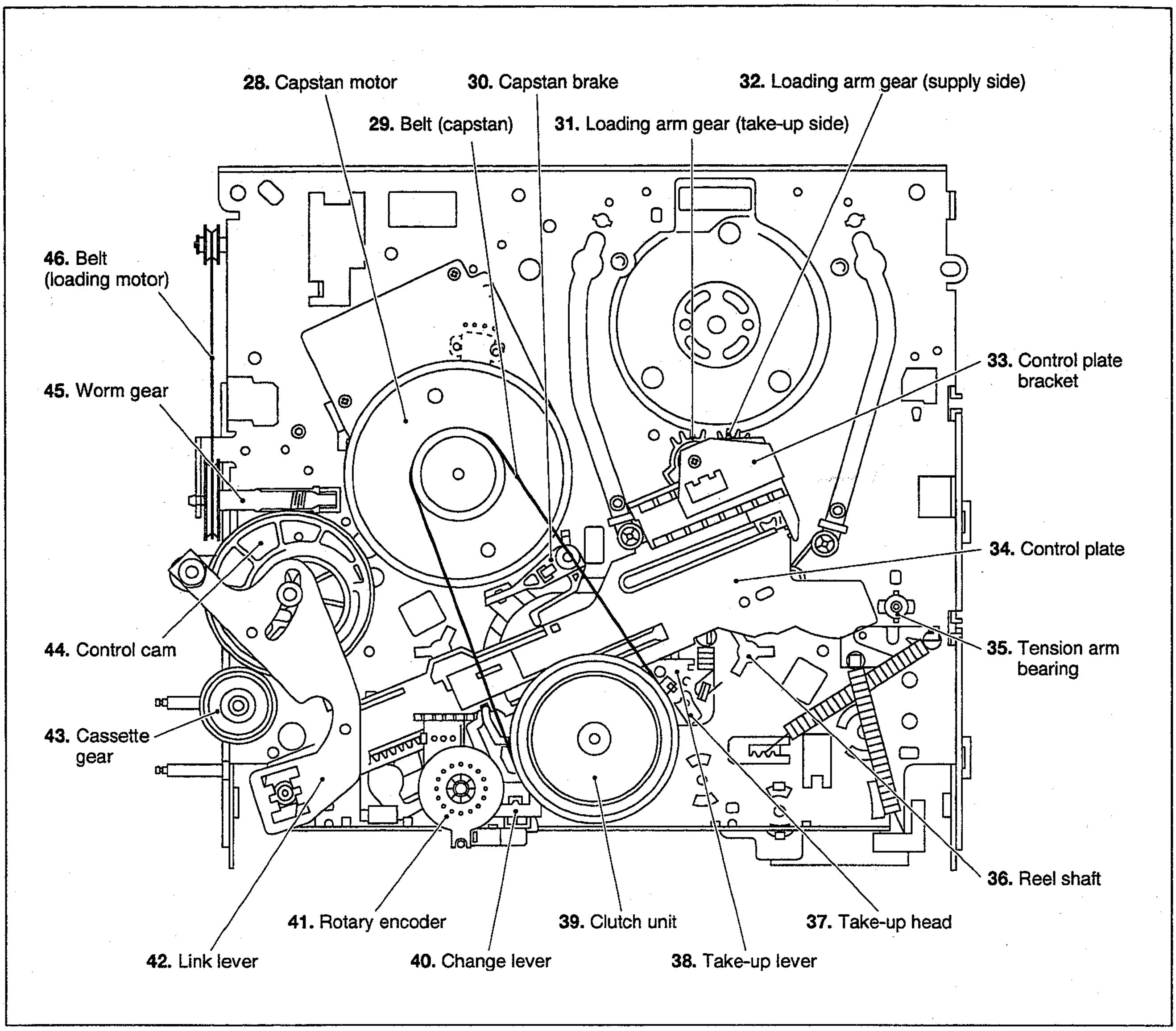

28. Capstan motor
30. Capstan brake
32. Loading arm gear (supply side)
29. Belt (capstan)
31. Loading arm gear (take-up side)
46. Belt (loading motor)
45. Worm gear
33. Control plate bracket
34. Control plate
44. Control cam
35. Tension arm bearing
43. Cassette gear
36. Reel shaft
41. Rotary encoder
39. Clutch unit
37. Take-up head
42. Link lever
40. Change lever
38. Take-up lever

Fig. 2-1-6 Main deck bottom side

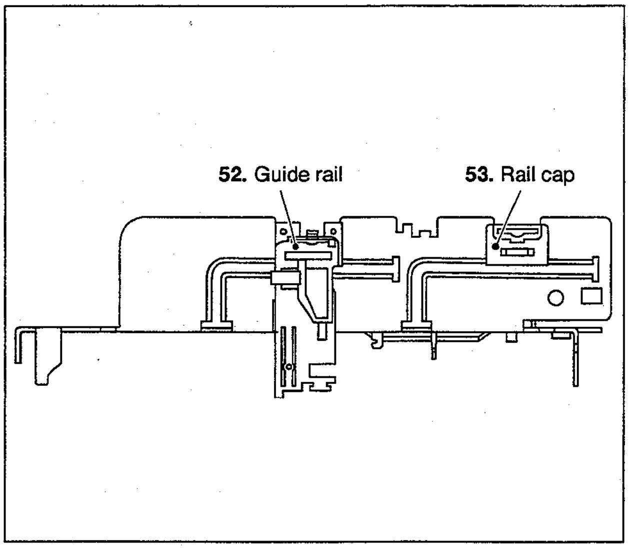

52. Guide rail
53. Rail cap

Fig. 2-1-7 Main deck left side

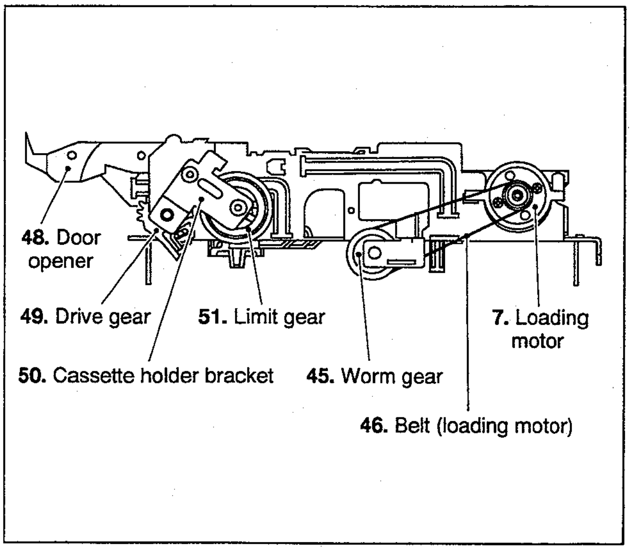

48. Door opener
49. Drive gear
51. Limit gear
7. Loading motor
50. Cassette holder bracket
45. Worm gear
46. Belt (loading motor)

Fig. 2-1-8 Main deck right side

Note: *Numerals at the start of the parts names are identical with those of the location diagrams of the major mechanical parts, 1 - 18 of which denote the order of removal. Of the alphabets T and B next to the parts names, T denotes removal from the main deck top side, B from the bottom side and T/B from both sides.*

			1,4	**12**	**53**	**46**	**9**	**52**	**11**	**50**	**–**	**–**	**–**	**49**	**32**	**–**	**–**	**38**	**25**	**23**	**31**	**21**	**42**	**41**	**29**	**39**	**40**	**33**	**34**	**14**	**19**	**54**
	Removable parts names Replacement parts names		UV catcher	Guide arm assembly	Rail cap	Belt (loading motor)	Pinch roller arm assembly	Guide rail	Press lever assembly	Cassette Holder bracket	Opener guide	Relay gear	Cassette holder assembly	Drive gear	Loading arm gear (supply side)	Drive arm assembly	Tension spring	Take-up lever	Tension arm assembly	Tension brake assembly	Loading arm gear (take-up side)	Reel base (supply side)	Link lever	Rotary encoder	Belt (capstan motor)	Clutch unit	Change lever	Control plate bracket	Control plate	Sub brake	Idler lever	Pinch roller guide
17	Idler arm	T			1			2		3	4	5	6	7		8				9		10	11	12	13	14	15	16	17		18	
15	Main brake (take-up side)	T/B			1			2		3	4	5	6	7		8							9	10	11	12	13	14	15	16		
13	Reel disk (take-up side)	T			1			2		3	4	5	6	7		8							9	10	11	12	13	14	15	16		
19	Idler lever	T/B			1			2		3	4	5	6	7		8				9		10	11	12	13	14	15	16	17			
–	Rotary encoder guide	T/B			1			2		3	4	5	6	7		8							9	10	11	12	13	14	15	16		
14	Sub brake (take-up side)	T/B			1			2		3	4	5	6	7		8							9	10	11	12	13	14	15			
–	Loading arm gear shaft	B													8						9		1	2	3	4	5	6	7			
35	Tension arm bearing	T			1			2		3	4	5	6				8		9	7												
–	Control plate guide	T/B																8					1	2	3	4	5	6	7			
37	Take-up head	B																8					1	2	3	4	5	6	7			
31	Loading arm gear (take-up side)	B													8								1	2	3	4	5	6	7			
25	Tension arm assembly	T/B			1			2		3	4	5	6				8			7												
20	Main brake (supply side)	T/B			1			2		3	4	5	6	7		8																
38	Take-up lever	T/B																					1	2	3	4	5	6	7			
32	Loading arm gear (supply side)	B																					1	2	3	4	5	6	7			
21	Reel disk (supply side)	T			1			2		3	4	5	6	7																		
–	Drive arm assembly	T			1			2		3	4	5	6	7																		
30	Capstan brake	T/B																					1	2	3	4	5	6	7			
34	Control plate	B																					1	2	3	4	5	6				
23	Tension brake assembly	T/B			1			2		3	4	5	6																			
–	Cassette holder assembly	T			1			2		3	4	5																				
–	Direct gear	B																						1	2	3	4					
10	Lid guide	T		1			2		3																							
40	Change lever	B																						1	2	3						
49	Drive gear	T								1	2	3																				
11	Press lever assembly	T		1			2																									
–	Relay gear	T								1	2																					
51	Limit gear assembly	T								1	2																					
26	Pole base assembly (supply side)	T/B	1																													
18	Pole base assembly (take-up side)	T/B	1																													
–	Tension spring (Main brake)	T																														
22	Rec safety lever	T/B																														
28	Capstan motor	T/B																							1							2
45	Worm gear	B				1																										
44	Control cam	B																					1									
43	Cassette gear	B																					1									
39	Clutch unit	B																							1							
9	Pinch roller arm assembly	T		1																												
–	Opener guide	T								1																						
8	Guide pole cap	T																														
54	Pinch roller guide	T																														
1,4	UV catcher	T																														
42	Link lever	B																														
41	Rotary encoder	B																														
12	Guide arm assembly	T																														
50	Cassette holder bracket	T																														
52	Guide rail	T																														
53	Rail cap	T																														
7	Loading motor assembly	T																														
5	A/C head assembly	T																														

2. Cleaning

Regular cleaning of the transport system parts is desirable but practically impossible. So make it a rule to carry out cleaning of the tape transport system whenever the machine is serviced.

When the video head, tape guide and/or brush get soiled, the playback picture may appear inferior or at worst disappear, resulting in possible tape damage.

(1) When cleaning the upper drum (especially the video head), soak a piece of closely woven cloth or Kimu-wipe with alcohol and while holding the cloth onto the upper drum by the fingers, turn the upper drum counterclockwise.

Note: *Absolutely avoid sweeping the upper drum vertically as this will cause damage to the video head.*

(2) To clean the parts of the tape transport system other than the upper drum, use a piece of closely woven cloth or a cotton swab soaked with alcohol.

(3) After cleaning, make sure that the cleaned parts are completely dry before using the video tape.

3. Lubrication

With no need for periodical lubrication, you have only to lubricate new parts after replacement. If any oil or grease on contact parts is soiled, wipe it off and newly lubricate the parts.

(1) See the mechanism assembly and disassembly diagrams (M4) for the lubricating or greasing spots. See Table 2-1-2 for the types of oil or grease to be used.

Type	Name	Serial No.	Symbols on the disassembly diagrams
Grease	Maltemp SH-P	KYODO-SH-P	AA
Oil	Cosmohydro HV56	COSMO-HV56	BB

Table 2-1-2 Grease and oil used for the unit

4. Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary. Also note that rubber parts may deform in time, even if the set is not used.

System	Parts Name	Operation Hours	
		~1000H	~2000H
Tape transport	Upper drum assembly	★○	○
	A/C head	★○	★○
	Lower drum assembly	★	★○
	Pinch roller arm assembly	★	★
	Full erase head	★	★
	Tension arm assembly	★	★
	Capstan motor (Shaft)	★	★
	Guide arm assembly	★	★
Drive	Capstan motor		○
	Capstan brake		○
	Main brake		○
	Belt (Capstan)	○	○
	Belt (Loading motor)		○
	Loading motor		○
	Clutch unit		○
	Worm gear assembly		○
	Control plate		○
Other	Brush assembly	★○	★○
	Tension brake	○	○
	Rotary encoder		○

★: Cleaning
○: Inspection or Replacement if necessary

Table 2-1-3

2.2 REPLACEMENT OF MAJOR PARTS

2.2.1 Before Starting Disassembling

This unit is provided with a mechanism assembly mode. It is therefore necessary to enter this mode for assembling and disassembling procedures.
This mode is usually not in use, manually set it when it is required.

2.2.2 How to Set the Mechanism Assembling Mode

Remove the main deck assembly and place it bottom side up. (See SECTION 1 DISASSEMBLY). Turn the worm gear toward the front so that the register hole of the control cam is brought into alignment with the hole at the main deck assembly chassis. This position renders the mechanism assembling mode operational. Make sure that the control plate is located in alignment with the mark E. (See Fig.2-2-1)

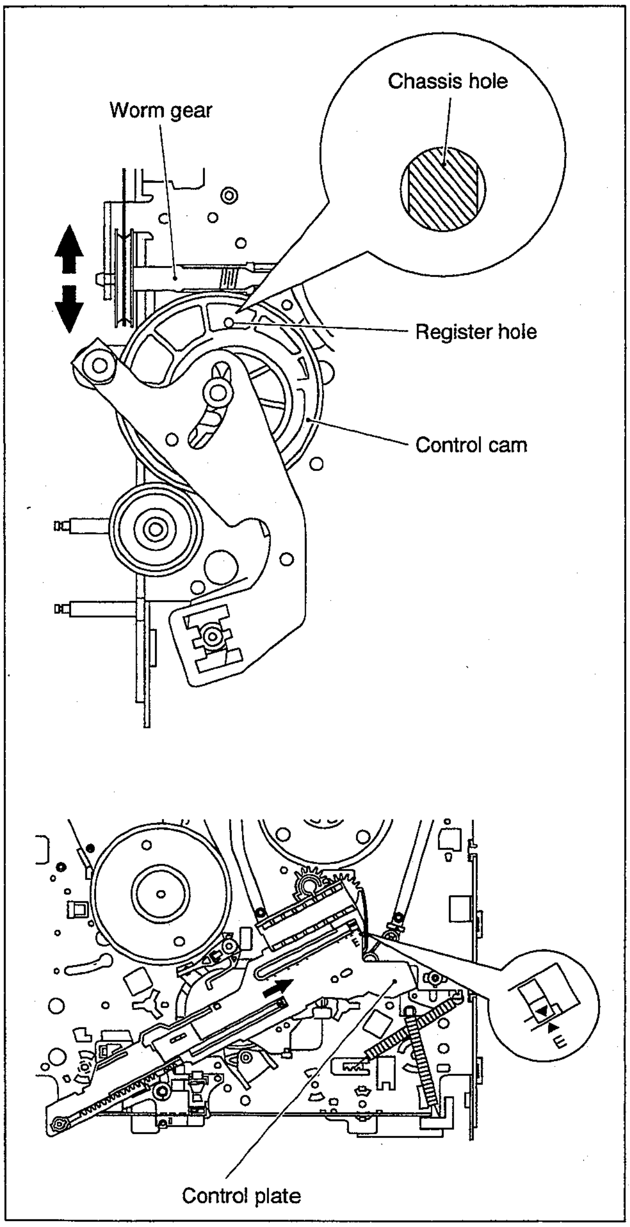

Chassis hole
Worm gear
Register hole
Control cam
E
Control plate

Fig. 2-2-1

2.2.3 Cassette Holder Assembly

1. How to remove

(1) Remove the guide rail and rail cap. (See Fig.2-2-2).
(2 lugs on the guide rail and one lug on the rail cap)

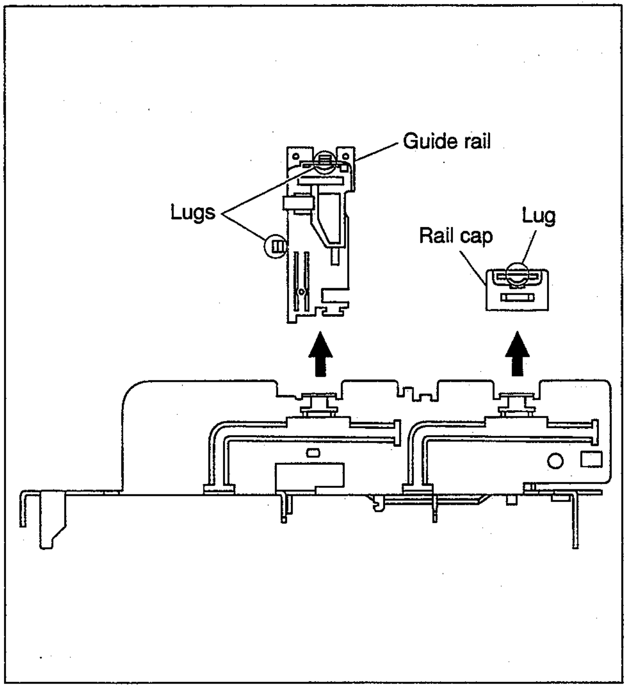

Guide rail
Lugs
Lug
Rail cap

Fig. 2-2-2

(2) Remove the two slit washers and remove the cassette holder bracket. (See Fig.2-2-3)

(3) Remove the opener guide, relay gear and limit gear. (See Fig.2-2-3)

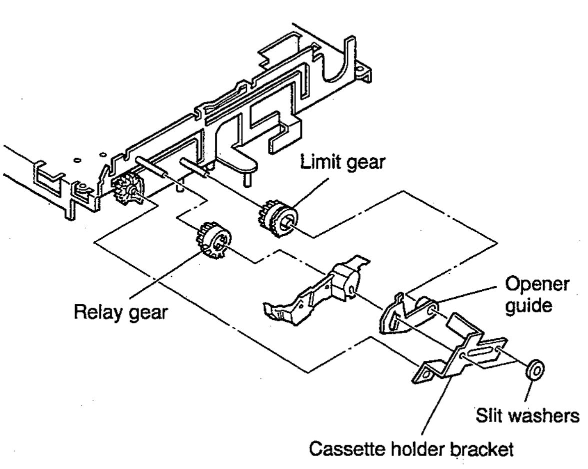

Limit gear
Opener guide
Relay gear
Slit washers
Cassette holder bracket

Fig. 2-2-3

(4) While swinging the lock levers (R) and (L) of the cassette holder assembly toward the front, slide the cassette holder assembly until its legs come to where the guide rail and the rail cap have been removed (so that the drive arm is upright). (See Fig.2-2-4)

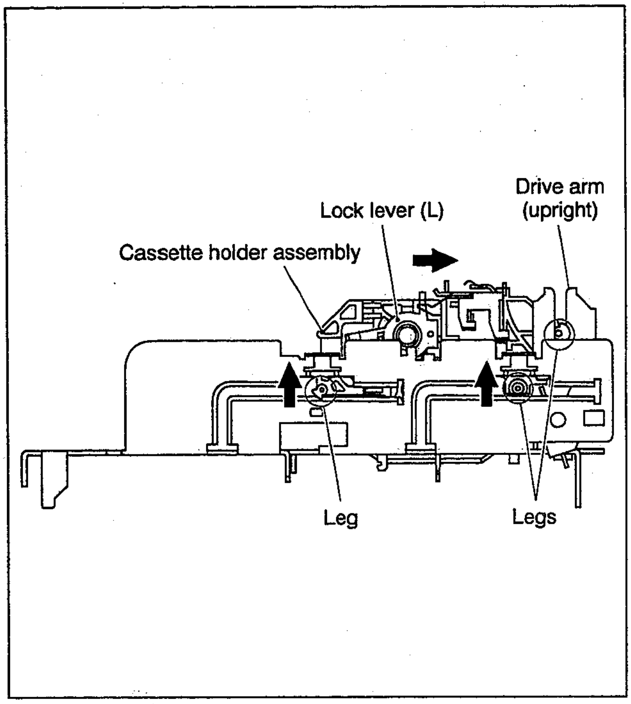

Drive arm (upright)
Lock lever (L)
Cassette holder assembly
Leg
Legs

Fig. 2-2-4

(5) While holding the left side of the cassette holder, lift the cassette holder assembly so that the three legs on the left side are all released. Then pull the legs Ⓐ and Ⓑ on the right side out of the rail and also pull up the leg Ⓒ. (See Fig.2-2-5, Fig.2-2-6)

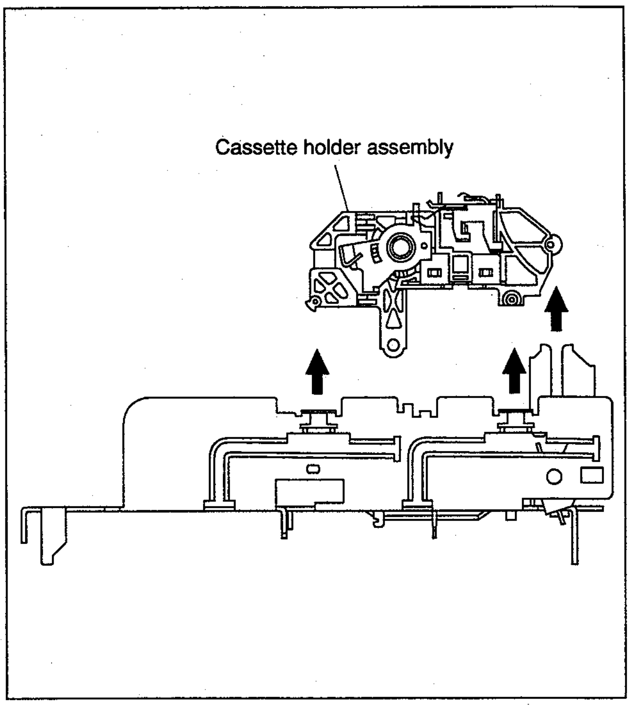

Cassette holder assembly

Fig. 2-2-5

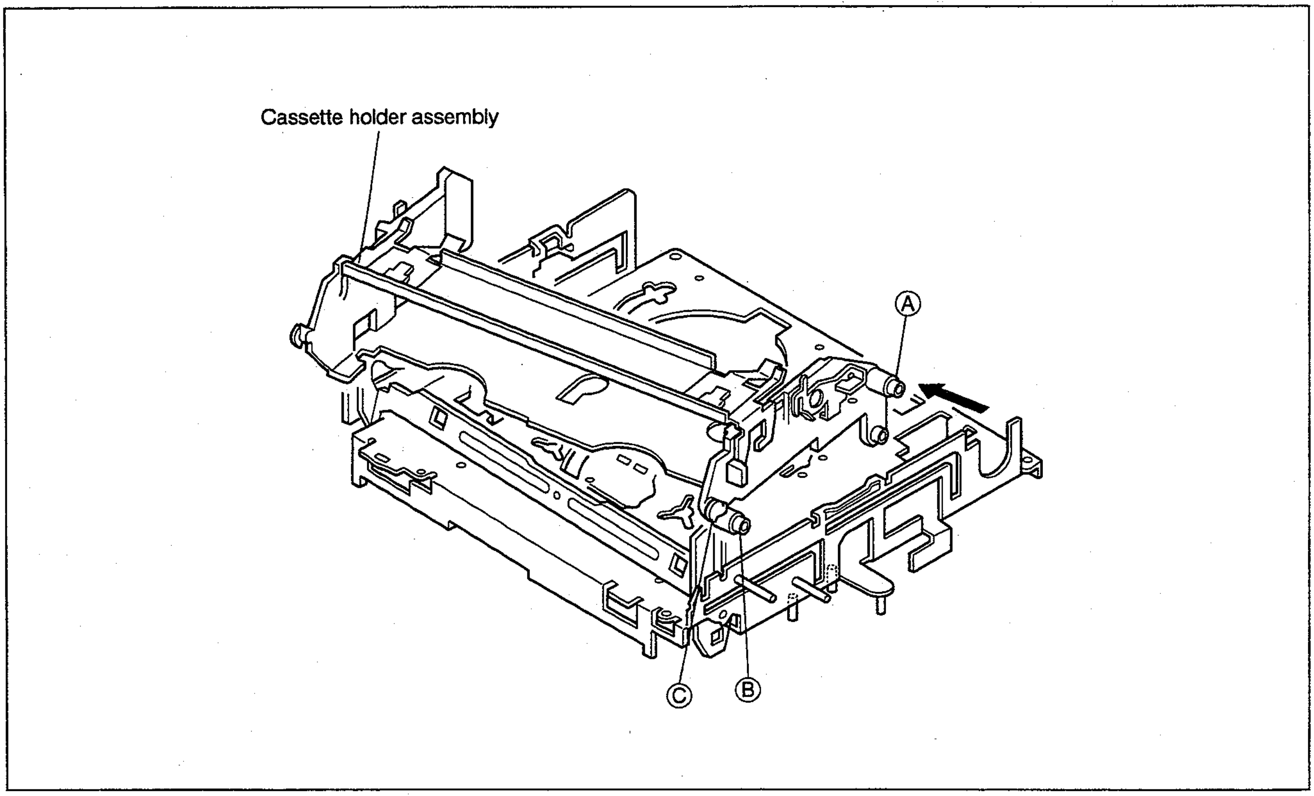

Cassette holder assembly
Ⓐ
Ⓒ
Ⓑ

Fig. 2-2-6

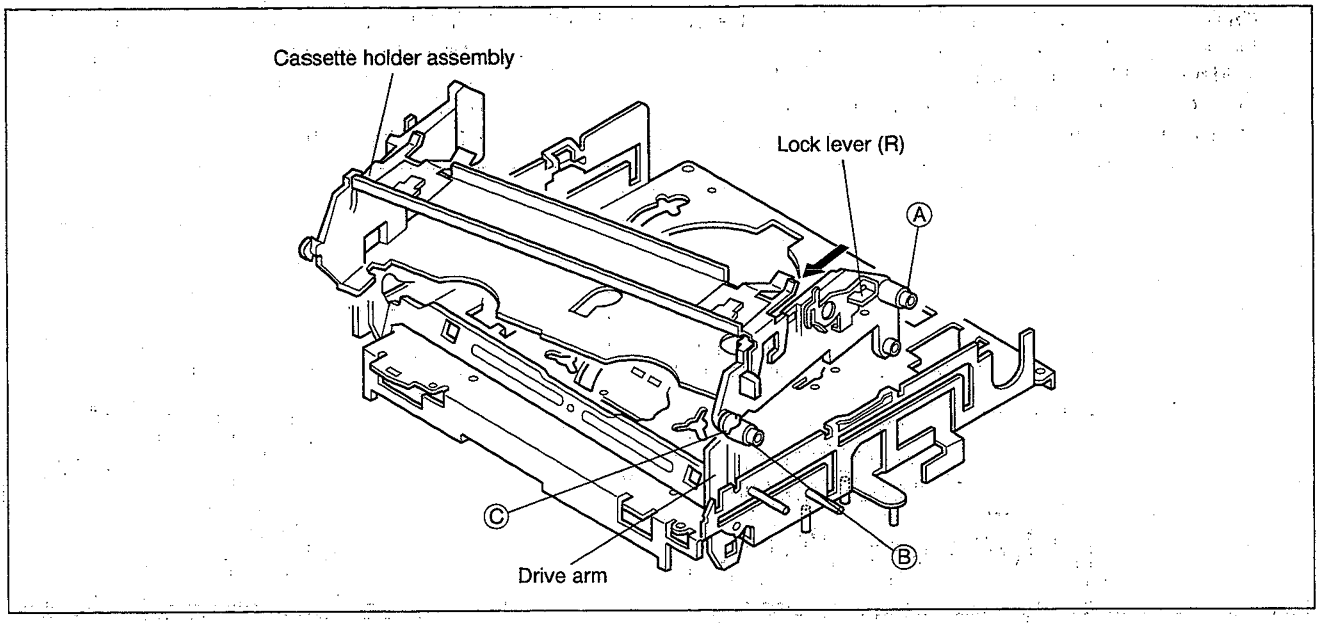

Cassette holder assembly
Lock lever (R)
Ⓐ
Ⓒ
Ⓑ
Drive arm

Fig. 2-2-7

2. How to install

(1) Hold the drive arm upright and fit the leg Ⓒ on the right side of the cassette holder assembly into the groove. (See Fig.2-2-7)

(2) While swinging the lock lever (R) of the cassette holder assembly toward front, put the legs Ⓐ and Ⓑ into the rail. (See Fig.2-2-7)

(3) Drop the three legs on the left side of the cassette holder into the groove at one time. (See Fig.2-2-8)

(4) Slide the whole cassette holder toward the front to bring it to the eject end position.

(5) Install the limit gear so that the notch on the outer circumference of the limit gear is brought into alignment with the register hole on the main deck. (See Fig.2-2-9)

(6) Install the relay gear so that the notch on the outer circumference of the relay gear is brought into alignment with the notch on the main deck. It is important at this stage that the register hole at the limit gear, the register hole at the relay gear and the register hole at the drive gear are all in alignment. (See Fig.2-2-9).

(7) Install the door stopper, opener guide and cassette holder bracket and fasten the two slit washers.

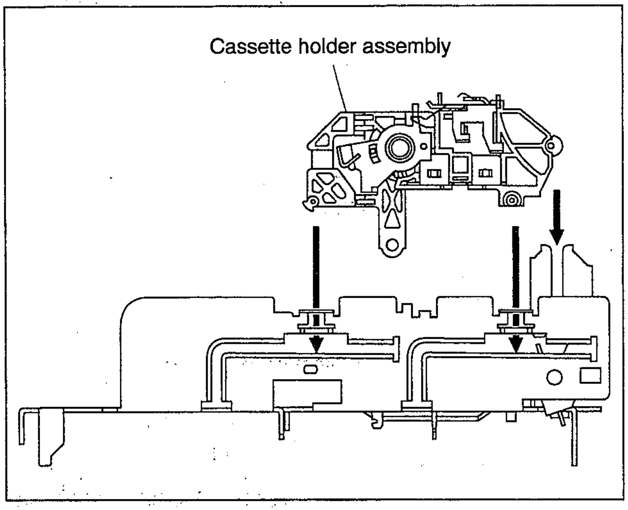

Cassette holder assembly

Fig. 2-2-8

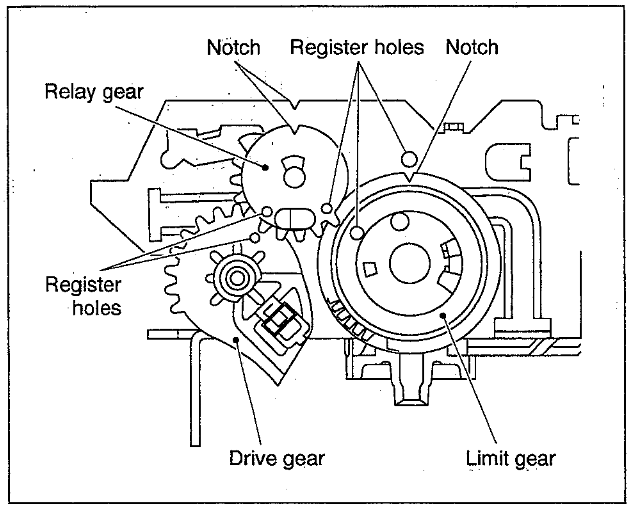

Notch
Register holes
Notch
Relay gear
Register holes
Drive gear
Limit gear

Fig. 2-2-9

2.2.4 Pinch Roller Arm Assembly

1. How to remove

(1) Remove the spring from the hook of the press lever.
(2) Remove the slit washer and remove the pinch roller seat. (See Fig.2-2-10)
(3) Remove the pinch roller arm assembly by pulling it up.

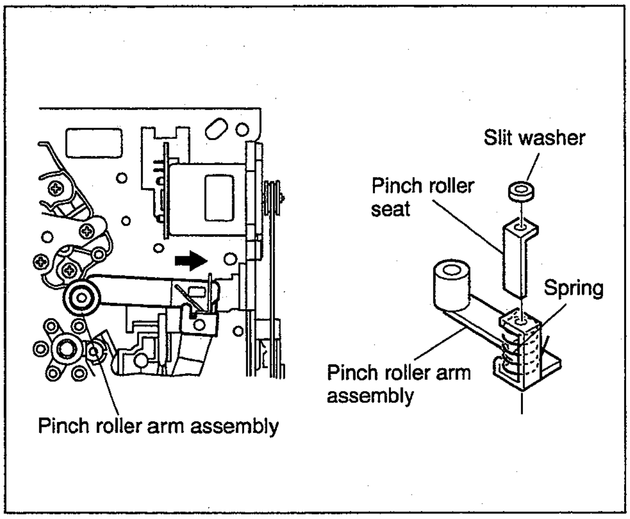

Slit washer
Pinch roller seat
Spring
Pinch roller arm assembly
Pinch roller arm assembly

Fig. 2-2-10

2.2.5 Guide Arm and Press Lever

1. How to remove

(1) Remove the spring and expand the lug of the lid guide in the arrow-indicated direction. Then remove the guide arm by pulling it up.
(2) Remove the press lever by pulling it up. (See Fig.2-2-11)

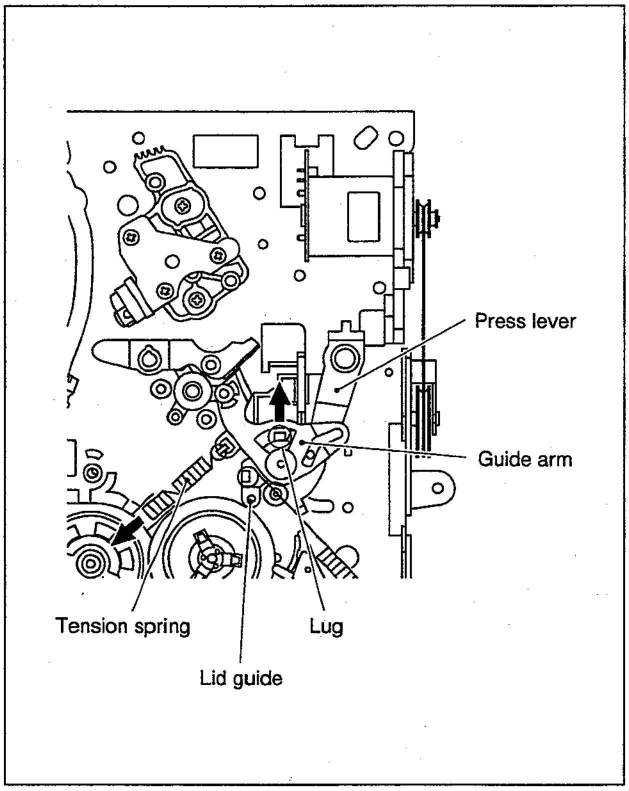

Press lever
Guide arm
Tension spring
Lug
Lid guide

Fig. 2-2-11

2.2.6 Audio Control Head

1. How to remove

(1) Remove two screws (A) and remove the audio control head together with the head base.

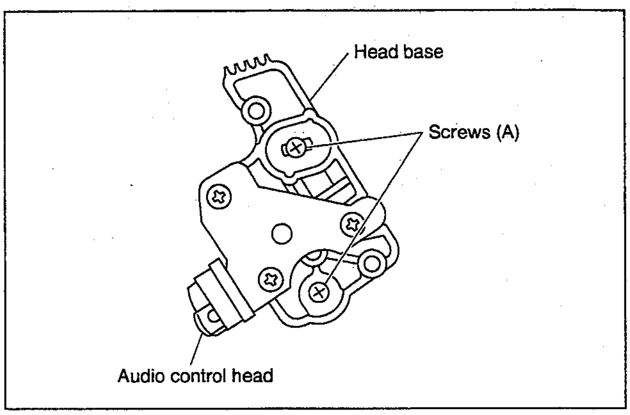

Head base
Screws (A)
Audio control head

Fig. 2-2-12

(2) When replacing only the audio control head, remove the three screws (B) while controlling the compression spring.

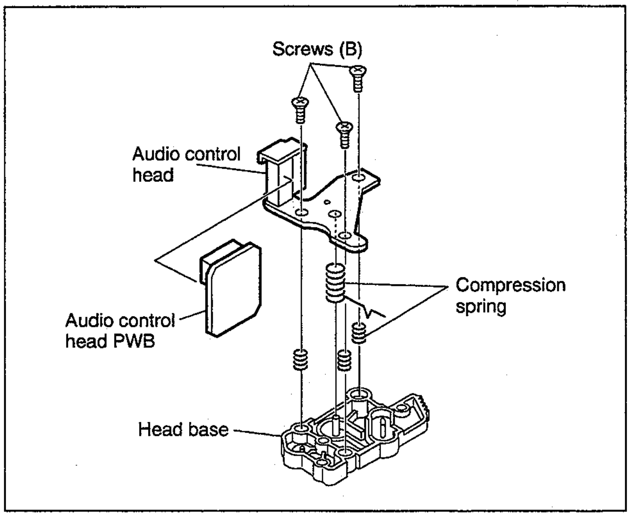

Screws (B)
Audio control head
Compression spring
Audio control head PWB
Head base

Fig. 2-2-13

2. How to install

(1) To make the post-installation adjustment easier, set the temporary level as indicated in Fig.2-2-14. Also make sure that the screw center is brought into alignment with the center position of the slot.

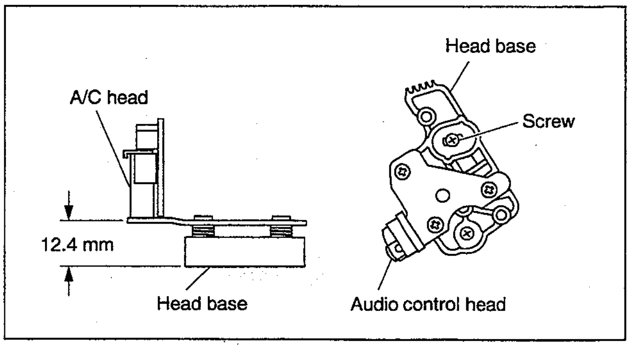

Head base
A/C head
Screw
12.4 mm
Head base
Audio control head

Fig. 2-2-14

2.2.7 Loading Motor

1. How to remove

(1) Remove the belt wound around the worm gear.
(2) Open the two lugs of the motor guide and remove the loading motor, loading motor PWB and motor guide altogether by pulling them up.
(3) When replacing the motor base, take care with the orientation of the motor (so that the label faces upward).
(4) When the motor pulley has been replaced, choose the fitting dimension as indicated in Fig.2-2-15.

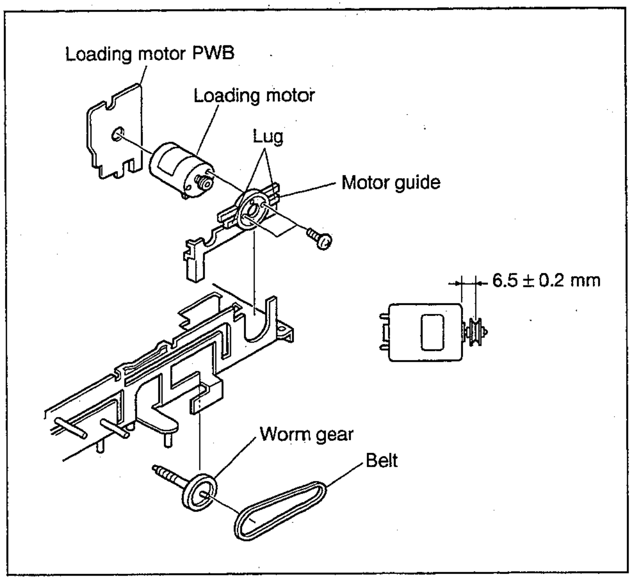

Loading motor PWB
Loading motor
Lug
Motor guide
6.5 ± 0.2 mm
Worm gear
Belt

Fig. 2-2-15

2.2.8 Capstan Motor

1. How to remove

(1) Remove the belt (capstan) on the main deck back side.
(2) Remove one screw (A) and remove the pinch roller guide.
(3) Remove two screws (B) and remove the capstan motor.

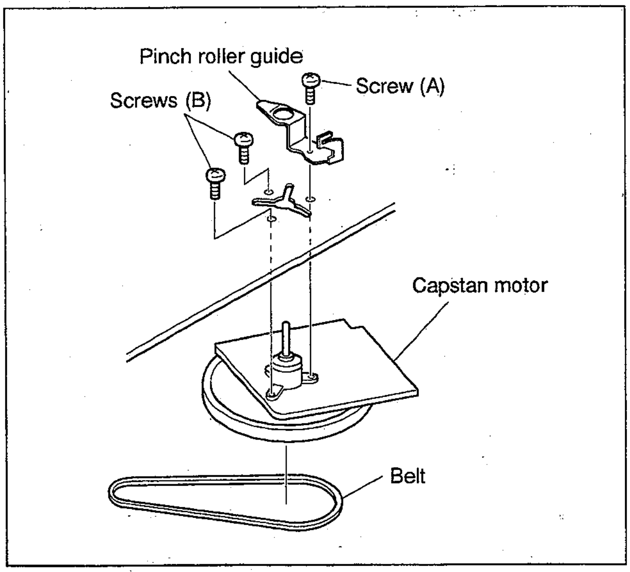

Pinch roller guide
Screws (B)
Screw (A)
Capstan motor
Belt

Fig. 2-2-16

2. How to install

Please refer to page 2-25.

2.2.9 Pole Base (on the supply or take-up side)

1. How to remove

(1) Remove the UV catcher on the removal side by loosening one screw (A).
(2) Remove the pole base on the supply side from the main deck by loosening one screw (B) on the main deck back side and sliding the pole base toward the UV catcher.
(3) As for the pole base on the take-up side, turn the pulley of the loading motor to lower the cassette holder because the screw (B) is hidden under the control plate (See the "Procedures for Lowering the Cassette holder assembly" on page 1-3 of 1.3 DISASSEMBLY/ASSEMBLY METHOD). Further turn the motor pulley to move the cassette holder until the screw (B) is no longer under the control plate (in the half-loading position). Then remove it as done for the supply side by removing one screw (B).

NOTE: *After reinstalling the Pole base and the UV catcher, be sure to perform compatibility adjustment.*

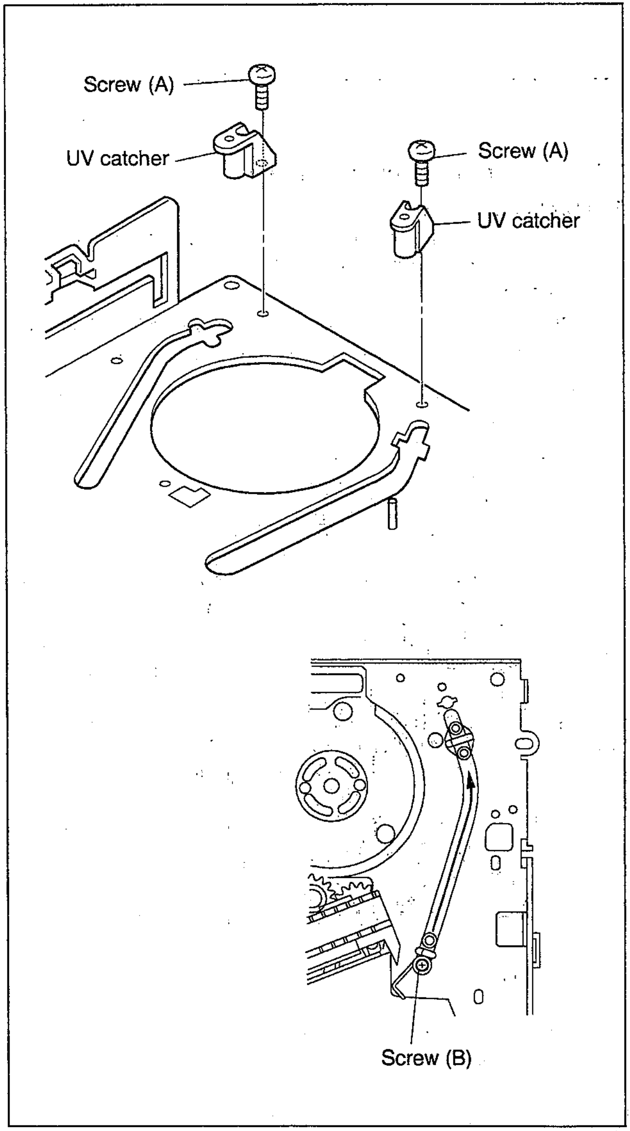

Screw (A)
UV catcher
Screw (A)
UV catcher
Screw (B)

Fig. 2-2-17

2.2.10 Rotary Encoder

(1) Remove one screw (A) and remove the rotary encoder by pulling it up.
(2) When installing the rotary encoder, bring the register marks into alignment as indicated in Fig.2-2-18.

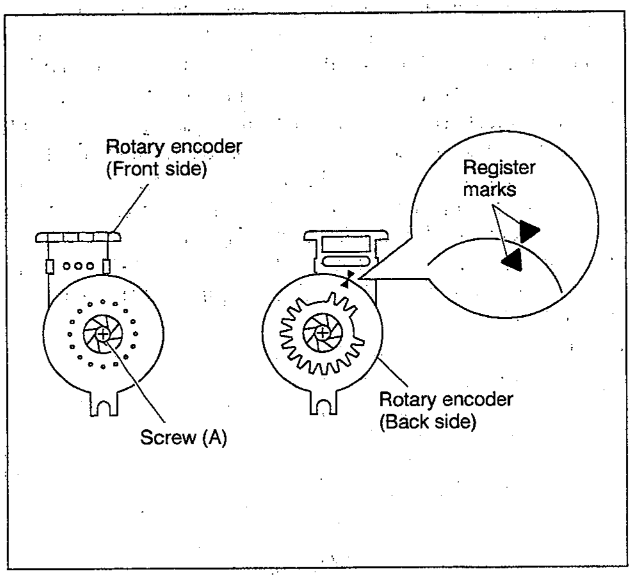

Rotary encoder
(Front side)
Register
marks
Screw (A)
Rotary encoder
(Back side)

Fig. 2-2-18

2.2.11 Clutch Unit

(1) Remove the belt wound around the capstan motor and the clutch unit.
(2) Remove the slit washer and remove the clutch unit.

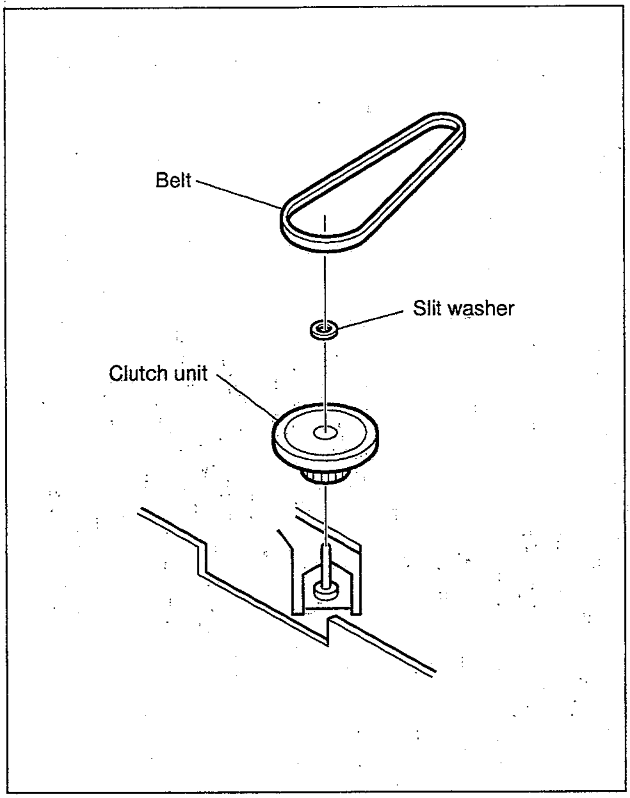

Belt
Slit washer
Clutch unit

Fig. 2-2-19

2.2.12 Change Lever and Direct Gear

(1) Release two lugs of the rotary encoder guide in the arrow-indicated direction and remove the change lever.
(2) Remove the slit washer retaining the direct gear and remove the latter.
Take care of the two washers and one spring on and under the direct gear. (See Fig.2-2-20)

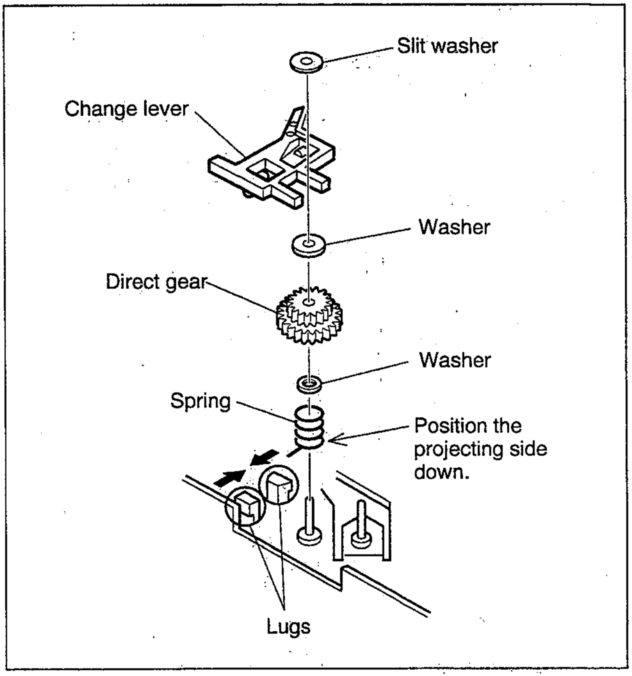

Slit washer
Change lever
Washer
Direct gear
Washer
Spring
Position the projecting side down.
Lugs

Fig. 2-2-20

2.2.13 Link Lever

(1) Remove the two slit washers.
(2) Remove the link lever by lifting it from the shaft retained by the slit washers. Then swing the link lever counterclockwise and remove it from the lock member of the control plate.

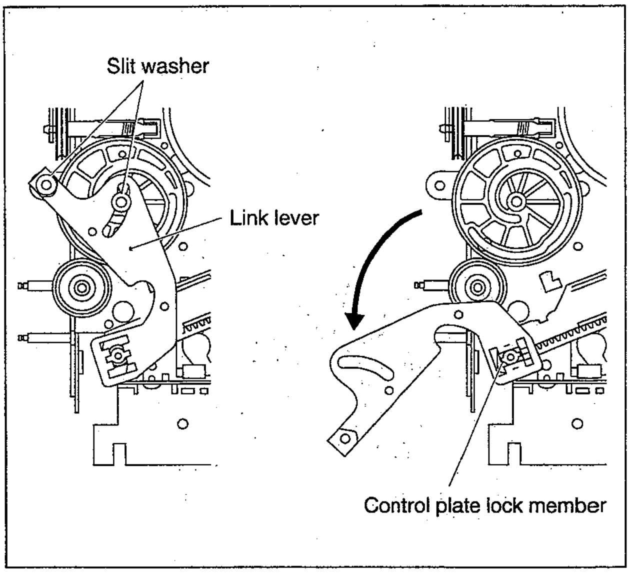

Slit washer
Link lever
Control plate lock member

Fig. 2-2-21

2.2.14 Cassette Gear, Control Cam and Worm Gear

(1) Remove the control cam by lifting it.

(2) Open the two lugs of the cassette gear outward and pull the latter off.

(3) Remove the belt wound around the worm gear and the loading motor.

(4) Open the lug of the lid guide outward and remove the worm gear.

(5) When installing the control cam, make sure that the register hole at the control cam is in alignment with the register hole of the main deck. (See Fig.2-2-22)

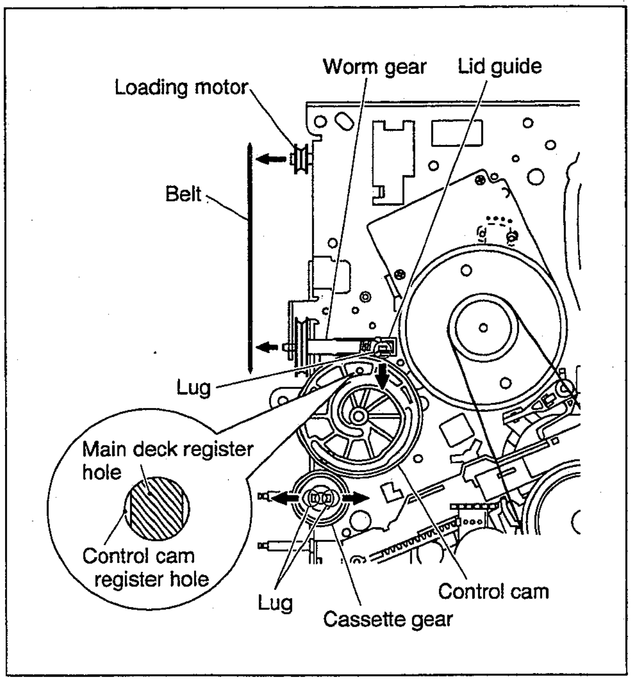

Loading motor
Worm gear
Lid guide
Belt
Lug
Main deck register hole
Control cam register hole
Lug
Control cam
Cassette gear

Fig. 2-2-22

2.2.15 Control Plate

1. How to remove

(1) Remove one screw (A) retaining the control plate bracket and remove the latter.

(2) Slide the control plate as indicated by the arrow and remove the control plate. (See Fig.2-2-23)

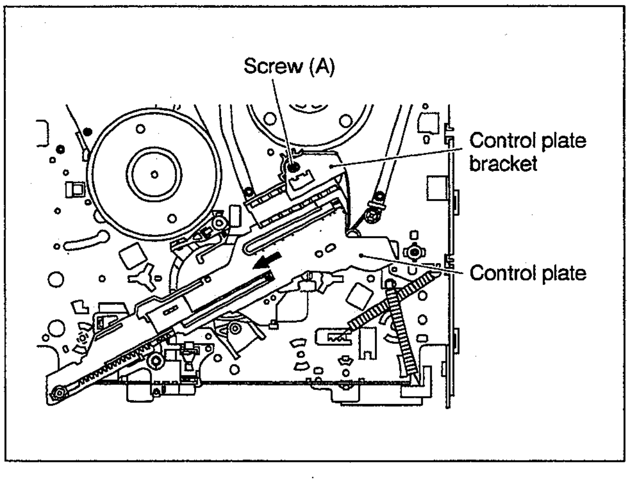

Screw (A)
Control plate bracket
Control plate

Fig. 2-2-23

2. How to install

(1) Adjust the position of the idler arm pin as indicated in Fig.2-2-24. (to the left of center of the R section)

(2) Bring the positioning hole of the take-up lever into alignment with the hole at the control plate guide and fix the position by inserting a 1.5 mm hexagonal wrench.

(3) Press-fit the pole base (on the supply side) as indicated by the arrow and install the control plate so that section A of the loading arm gear shaft fits into hole (A) of the control plate, section B of the control plate guide into hole (B), and the control plate comes under section C of the rotary encoder guide and section D of the loading arm (on the take-up side). Then slide the whole control plate in the arrow-indicated direction. (See Fig.2-2-25).

(4) Make sure that the mark E of the control plate is in alignment with the mark ▼ of the loading arm gear shaft. (See Fig.2-2-25)

(5) Pull off the hexagonal wrench for positioning.

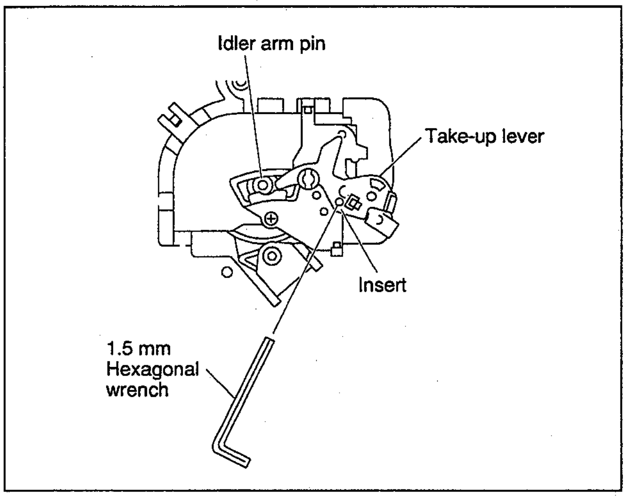

Idler arm pin
Take-up lever
Insert
1.5 mm Hexagonal wrench

Fig. 2-2-24

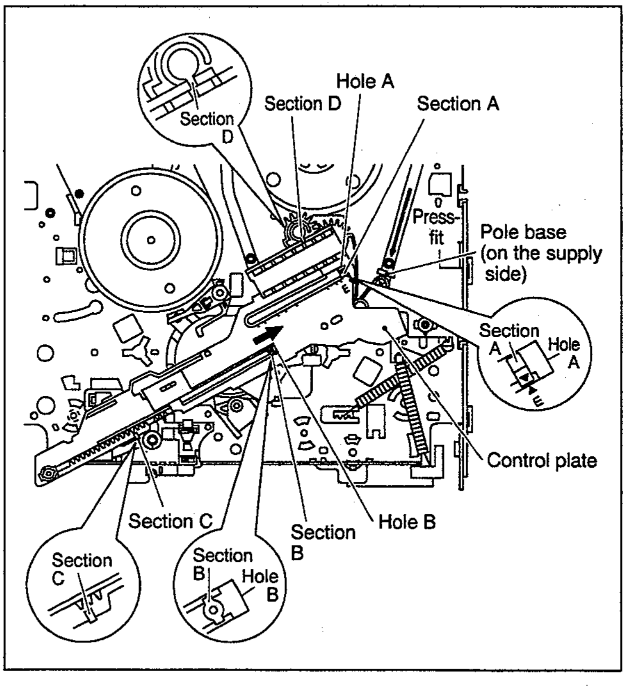

Section D
Hole A
Section D
Section A
Press-fit
Pole base (on the supply side)
Section A
Hole A
E
Control plate
Section C
Section B
Hole B
Section C
Section B
Hole B

Fig. 2-2-25

2.2.16 Loading Arm (on the supply or take-up side) and Loading Arm Gear Shaft

1. How to remove

(1) Remove the loading arm (on the supply side) by loosening screw (A) in Fig.2-2-26.

(2) Remove screw (B) in Fig.2-2-26 and slide the pole base in the loading direction with the spring held on the pole base (on the take-up side). (See Fig.2-2-26)

(3) Pull the spring out of the pole base. Turn the loading arm clockwise through about 45 degrees so that the notch of the loading arm is in alignment with the projection of the loading arm gear shaft and lift it.
Likewise, turn the loading arm counterclockwise through 180 degrees so that the notch is in alignment with the projection and remove the loading arm (on the take-up side). (See Fig.2-2-27)

(4) When removing the loading arm gear shaft, be sure of first removing the screw retaining the drum assembly (on the back side of the loading arm gear shaft). Then remove one screw (C) and remove the loading arm gear shaft by sliding it in the arrow-indicated direction.

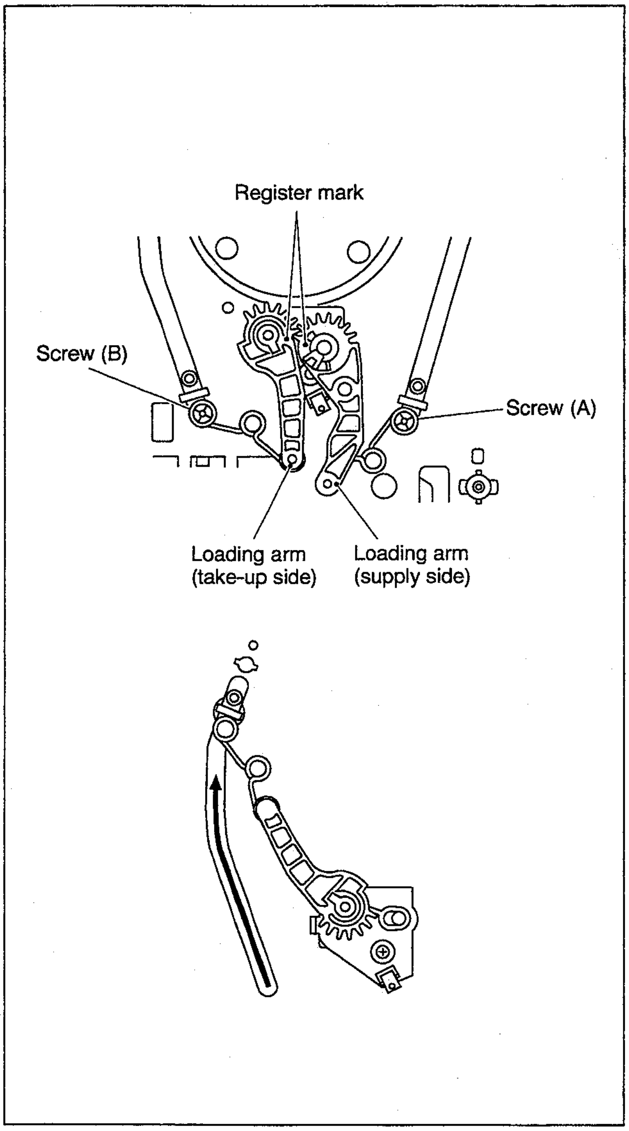


Fig. 2-2-26

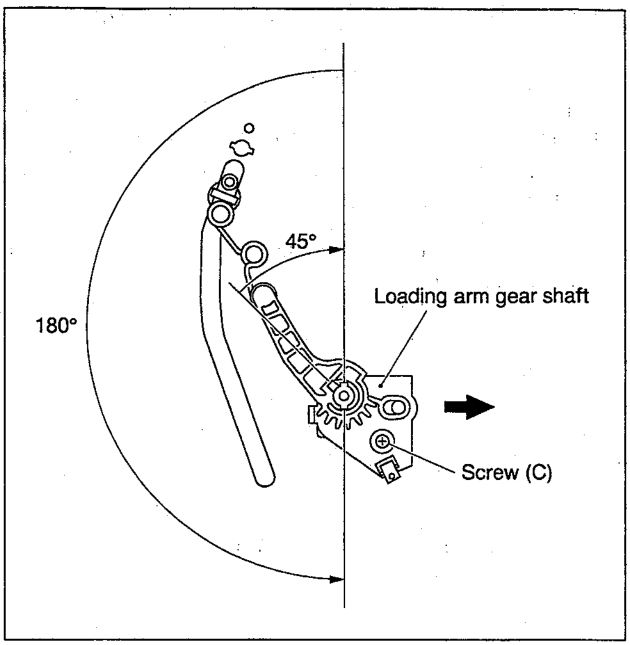


Fig. 2-2-27

2. How to install

(1) Install the loading arm (on the take-up side) as indicated in Fig.2-2-28 and turn it clockwise through 180 degrees so that the loading arm reaches the bottom of the loading arm gear shaft.

(2) Then turn the loading arm (on the take-up side) counterclockwise through 180 degrees. Hang the spring on the pole base and tighten the screw.

(3) Install the loading arm (on the supply side) so that the register mark of the loading arm (on the take-up side) is in alignment with the register mark of the loading arm (on the supply side). Then hang the spring on the pole base and tighten the screw. (See Fig.2-2-26).

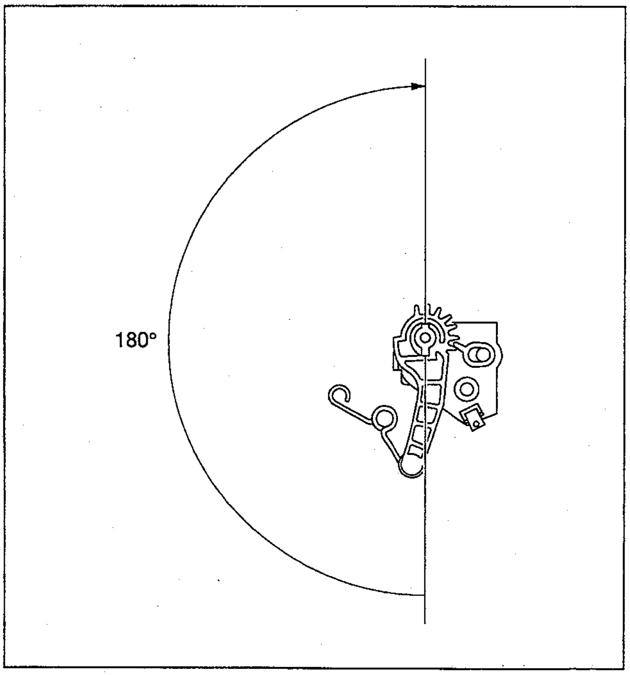


Fig. 2-2-28

2.2.17 Take-up Lever, Take-up Head and Control Plate Guide

(1) Remove the spring of the take-up lever from the main deck.
(2) Remove one lug of the take-up lever from the main deck and pull out the take-up lever and the take-up head together.
(3) Remove one screw (A).
(4) Remove two lugs of the control plate guide from the main deck. Locate the idler arm pin in the center of the R section of the control plate and remove the latter.

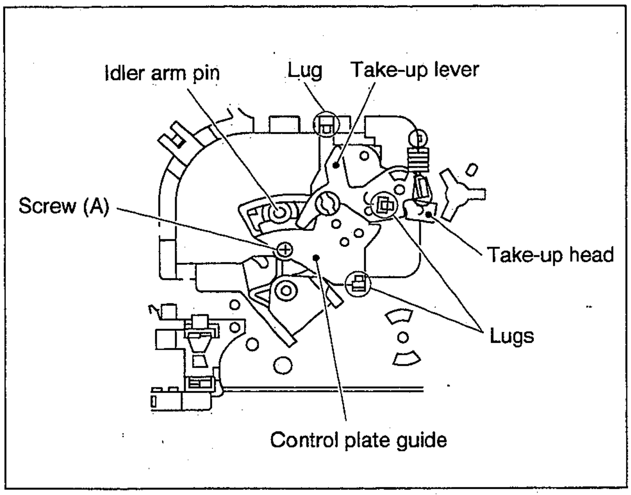


Fig. 2-2-29

2.2.18 Capstan Brake

(1) Move lug A of the capstan brake in the arrow-indicated direction so that it comes into alignment with the notch of the main deck. (See Fig. 2-2-30)
(2) Remove lug B of the capstan brake from the main deck and remove the capstan brake.

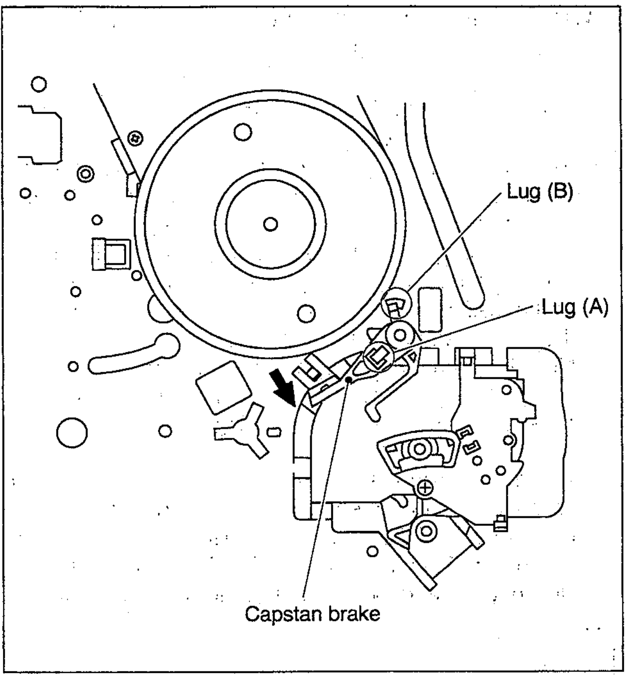


Fig. 2-2-30

2.2.19 Drive Gear and Drive Arm

1. How to remove

(1) Remove the cassette holder assembly. (See 2.2.3 How to remove the cassette holder assembly)
(2) Pull out the drive gear and remove the drive arm.

2. How to install

(1) Insert section A of the drive arm into section B of the main deck.
(2) Insert section ① of drive gear into hole ○ of the drive arm and section ② into hole □. (See Fig. 2-2-31)

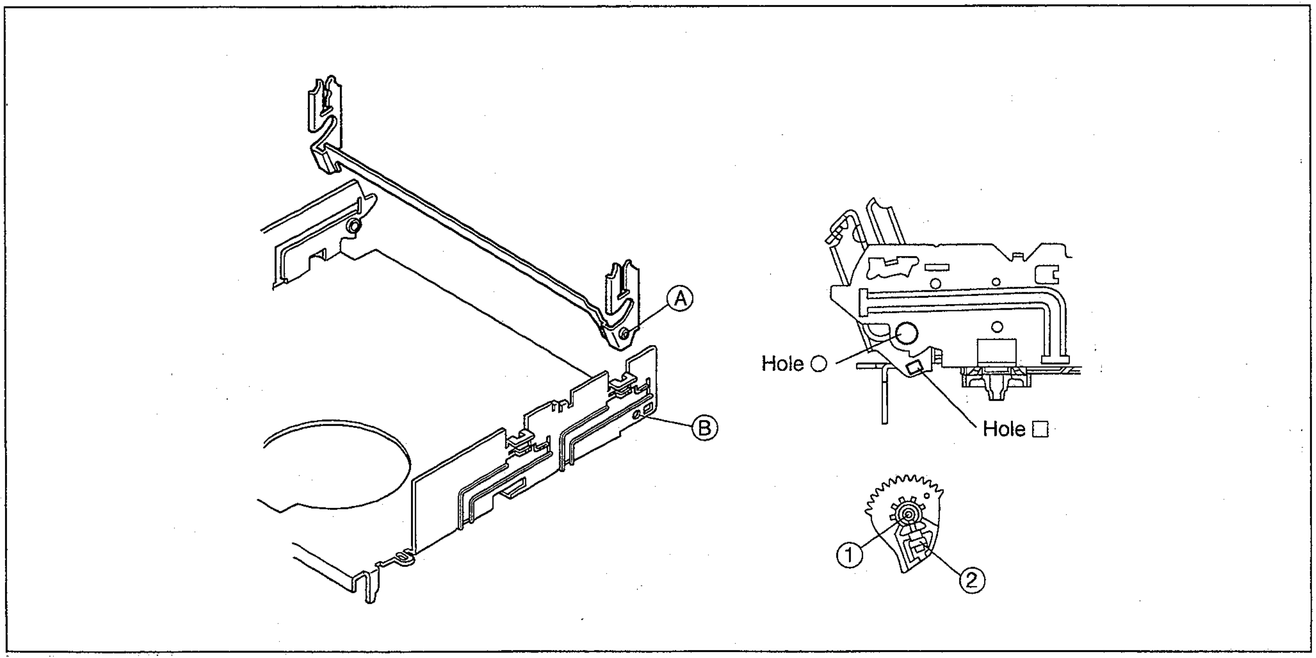


Fig. 2-2-31

2.2.20 Sub Brake (on the take-up side)

(1) Remove the spring attached to the lid guide and sub brake.
(2) Bring lug Ⓐ of the sub brake into alignment with the notch of the main deck.
(3) Remove lugs Ⓑ and Ⓒ of the sub brake from the main deck and remove the sub brake.

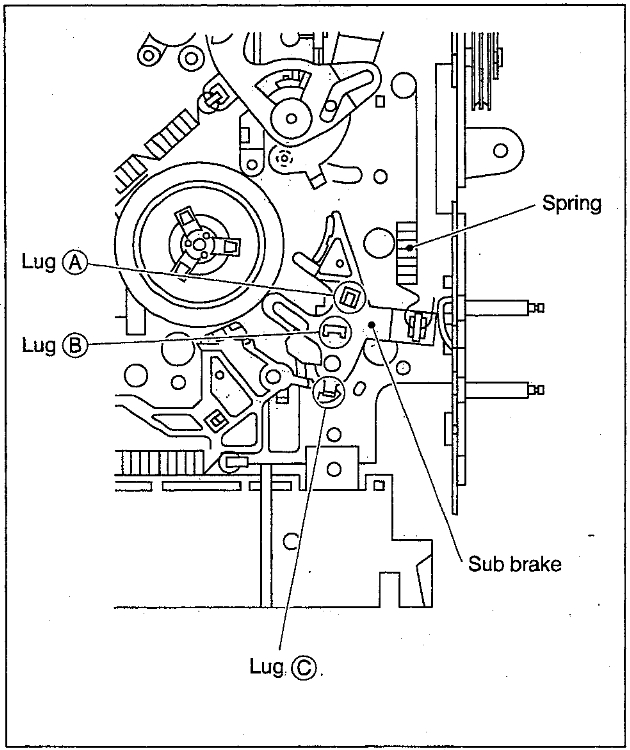

Spring
Lug Ⓐ
Lug Ⓑ
Sub brake
Lug Ⓒ

Fig. 2-2-32

2.2.21 Main Brake (on the take-up side), Reel Disk (on the take-up side) and Main Brake (on the supply side)

(1) Move the main brake (on the take-up side) in the arrow-indicated direction and remove the reel disk (on the take-up side).
(2) Remove the spring attached to the main brake.
(3) Remove lug Ⓐ of the main brake (on the take-up side) and pull out lug Ⓑ after bringing it into alignment with the main deck notch.
(4) Remove lugs Ⓒ and Ⓓ of the main brake (on the supply side) from the main deck and pull them off. (See Fig.2-2-33)

Note: *If the main brake is difficult to remove, press it and hold the adjustment pin from the back side of the main deck when attempting to remove it.*
After the adjustment pin has been removed or the main brake or the reel disk on the supply or take-up side have been replaced, it is required to adjust the main brake torque. See page 2-24 for the detailed adjustment procedures.

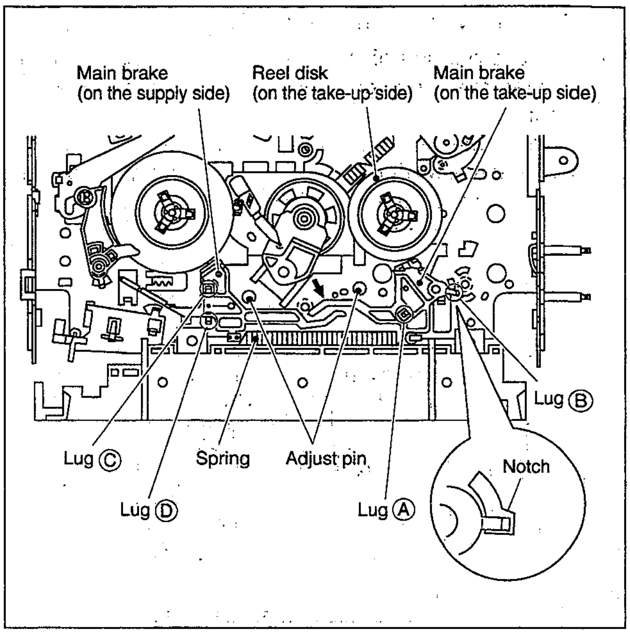

Main brake (on the supply side)
Reel disk (on the take-up side)
Main brake (on the take-up side)
Lug Ⓑ
Lug Ⓒ
Spring
Adjust pin
Notch
Lug Ⓓ
Lug Ⓐ

Fig. 2-2-33

2.2.22 Tension Brake, Reel Disk (on the supply side) and Tension Arm

(1) Remove the three lugs of the tension brake from the main deck and pull them off.
(2) Remove the reel disk (on the supply side) by loosening in the arrow-indicated direction the main brake (on the supply side).
(3) Remove the tension spring on the main deck back side and remove the lugs of the tension arm bearing to pull up and remove the tension arm. (See Fig.2-2-34)

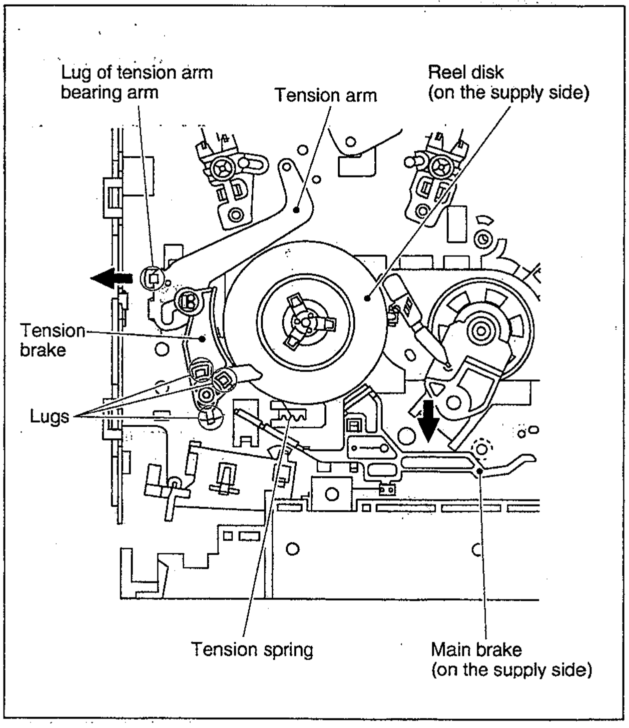

Lug of tension arm bearing arm
Tension arm
Reel disk (on the supply side)
Tension brake
Lugs
Tension spring
Main brake (on the supply side)

Fig. 2-2-34

2.2.23 Idler Lever, Idler Arm and Reel Shaft

(1) Remove one lug of the idler lever from the main deck and remove the hook fitted in the idler arm hole by lifting it.
(2) Remove the slit washer and pull out the idler arm.
(3) Turn the reel shaft counterclockwise through 60 degrees and remove it. (See Fig.2-2-35)

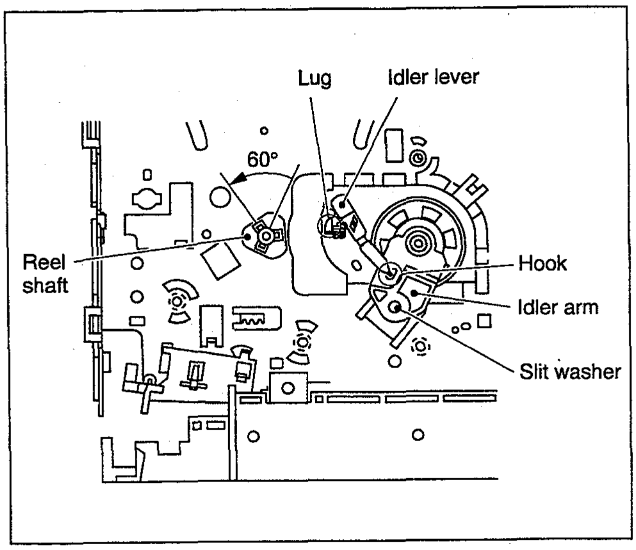

Lug
Idler lever
60°
Reel shaft
Hook
Idler arm
Slit washer

Fig. 2-2-35

2.2.24 Stator Assembly

(1) Remove two screws (A).
(2) Remove the stator assembly by lifting in the arrow-indicated direction (Take care that the brush spring does not jump out).
(3) Remove the flat cable.
(4) After installation, be sure to perform the 3.2.1 PB switching point adjustment according to the electrical adjustment procedure.

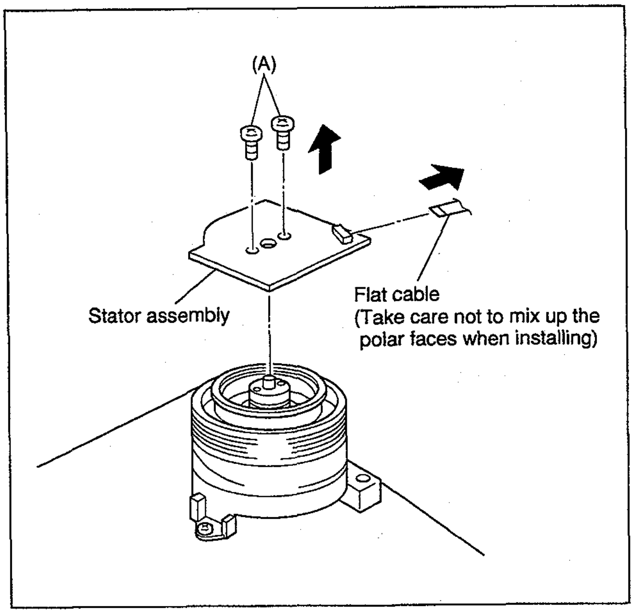

(A)
Stator assembly
Flat cable
(Take care not to mix up the polar faces when installing)

Fig. 2-2-36

2.2.25 Rotor Assembly

(1) Remove the stator assembly.
(2) Remove the two screws (B) and remove the rotor assembly.

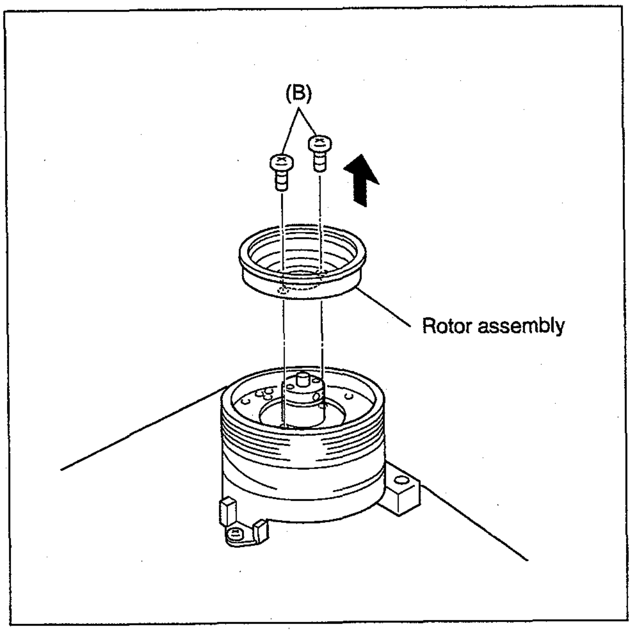

(B)
Rotor assembly

Fig. 2-2-37

Note: *When installing the rotor assembly, note that a normal picture cannot be obtained without ensuring the phase matching as mentioned below.*

(3) Match the phases of the upper drum and the rotor assembly as indicated in Fig.2-2-38.
(4) Place the upper drum hole (a) over the rotor assembly holes (b) (with three holes to be aligned) and tighten the two screws (B). (See Fig.2-2-38)

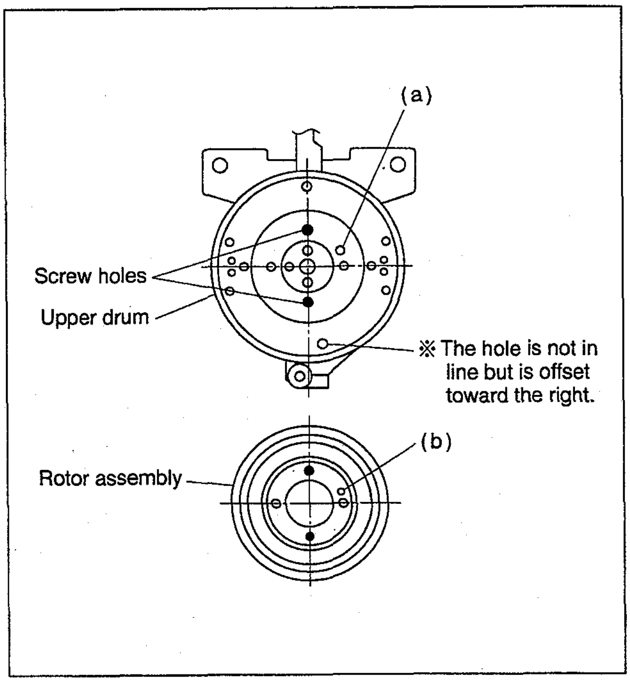

(a)
Screw holes
Upper drum
※ The hole is not in line but is offset toward the right.
(b)
Rotor assembly

Fig. 2-2-38

2.2.26 Upper Drum Assembly

1. How to remove

(1) Remove the stator assembly and rotor assembly. (See Fig. 2-2-36 and 2-2-37)

(2) Loosen the screw of the collar assembly using a 1.5 mm hexagonal wrench and remove the collar assembly. Also remove the brush, spring and cap at one time.

(3) Remove the upper drum assembly and remove the washer using tweezers.

Note: *When replacement is required, control the up-down movement of the brush. Never apply grease.*

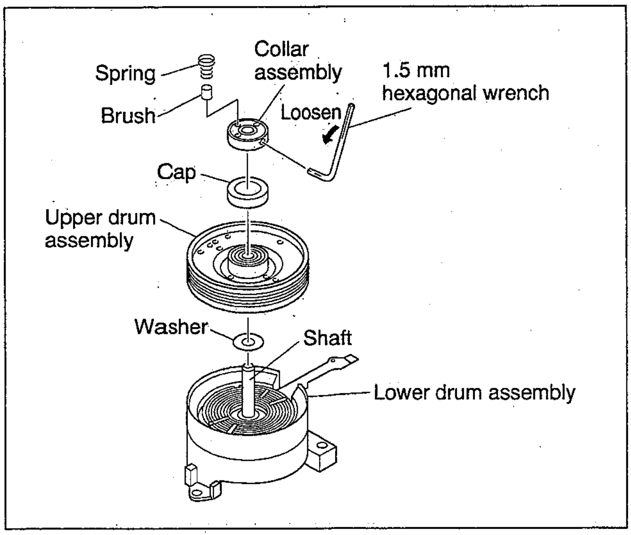

Spring
Collar assembly
1.5 mm hexagonal wrench
Brush
Loosen
Cap
Upper drum assembly
Washer
Shaft
Lower drum assembly

Fig. 2-2-39 Upper drum assembly-1

2. How to install

(1) Clean coil parts of the lower drum assembly and the newly installed upper drum assembly with an air brush in advance. (See Fig.2-2-40).

(2) Install a new washer and upper drum assembly on the drum shaft. (See Fig.2-2-39)

Note: *When replacing the upper drum assembly, replace it the together with the washer.*

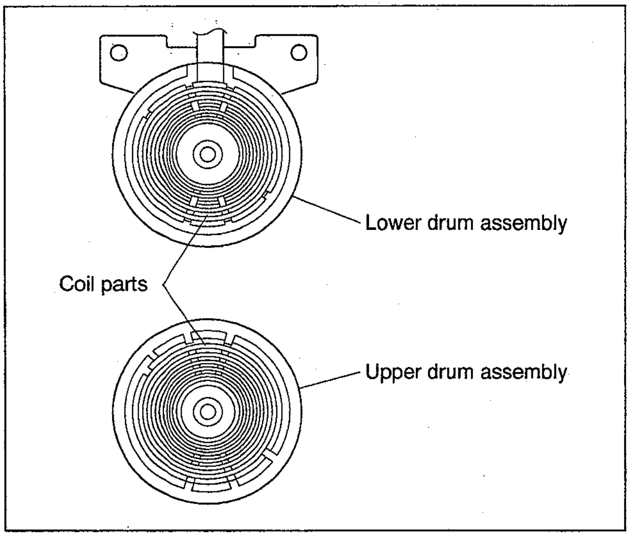

Lower drum assembly
Coil parts
Upper drum assembly

Fig. 2-2-40

(3) Position the collar assembly as indicated in Fig.2-41 while controlling its up- down movement.

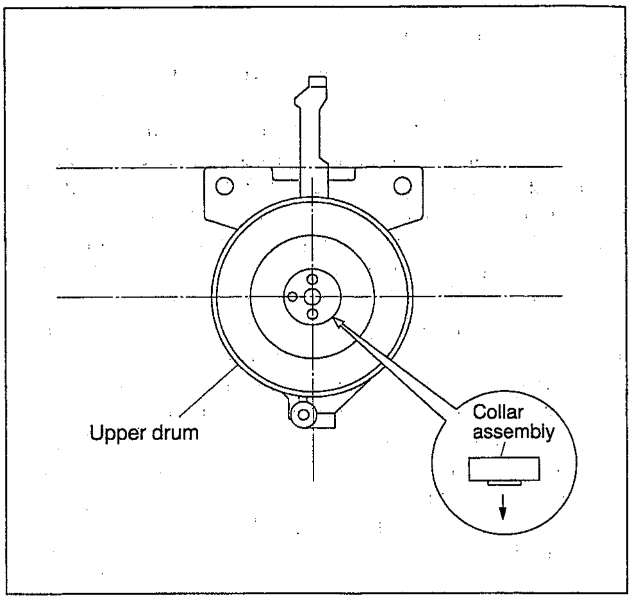

Upper drum
Collar assembly

Fig. 2-2-41

(4) Secure the collar assembly in position with a hexagonal wrench while pressing its top with the fingers.

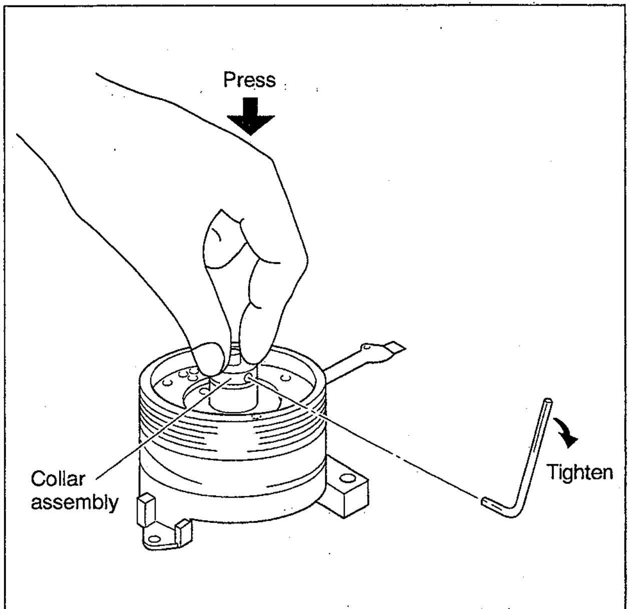

Press
Collar assembly
Tighten

Fig. 2-2-42

(5) After installation, gently turn the upper drum with your hand to make sure that it turns normally.

(6) Install the rotor assembly and stator assembly according to Fig. 2-2-36 and 2-2-38.

(7) When installation is complete, clean the upper drum assembly and lower the drum assembly and carry out the following adjustments.

- PB switching point adjustment
- Slow tracking adjustment
- Compatibility adjustment (Be sure to check for compatibility for the EP mode.)

2.3 MAJOR PARTS INSTALLATION (PHASE MATCHING BETWEEN MECHANICAL PARTS)

2.3.1 Before Assembly of the Parts

The mechanism of this unit is closely linked with the rotary encoder and system controller circuits.
Since the system controller detects the status of mechanical operation in response to phases of the rotary encoder (internal switch positions), the mechanism may not operate properly unless such parts as the rotary encoder, control plate, loading arm assembly, control cam, cassette gear, limit gear, relay gear and drive gear are installed in their correct positions.
Especially, this model is not provided with any cassette housing assembly, so that cassette loading and unloading must be accomplished by operation of the cassette holder assembly. The latter is in turn driven by such parts as drive gear, relay gear and limit gear. Exercise enough care, therefore, to have the phases of all this gear matching one another.
Perform the installation of major parts (including phase matching) in the mechanism assembling mode as in the previous section.

2.3.2 Loading Arm Assembly (on the Supply or Take-up Side)

(1) Return the pole base assembly to the foremost position in the unloading direction.
(2) Install the loading arm assembly so that the register mark on the gear of the supply side loading arm is in alignment with the one on the take-up side loading arm as indicated in Fig. 2-3-1.
See 2.2.16 "2. How to install" of the foregoing section for details of installation.

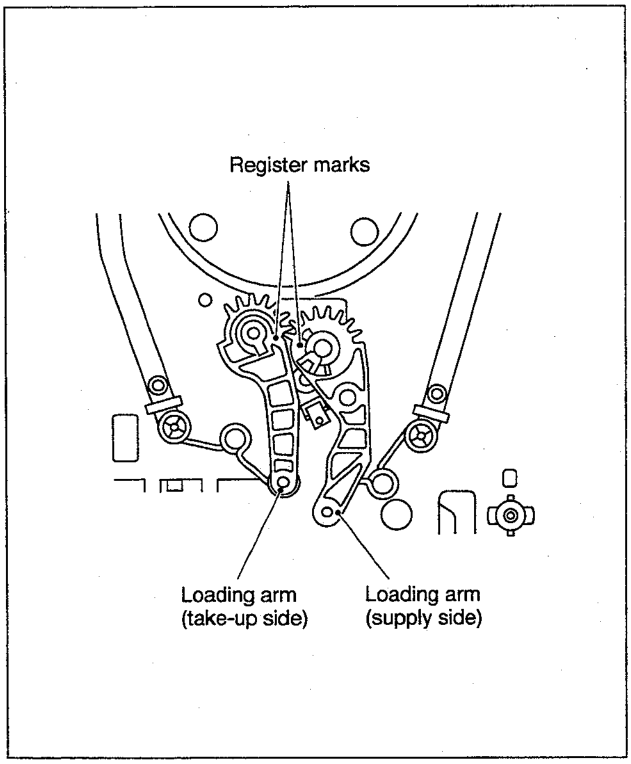


Fig. 2-3-1

2.3.3 Control Plate

(1) With register marks on the both loading arm assemblies in alignment, install the control plate so that the mark ▼ on the loading arm gear shaft is in alignment with mark E of the control plate. (See Fig.2-3-2)
See 2.2.15 "2. How to install" of the foregoing section for details of installation.

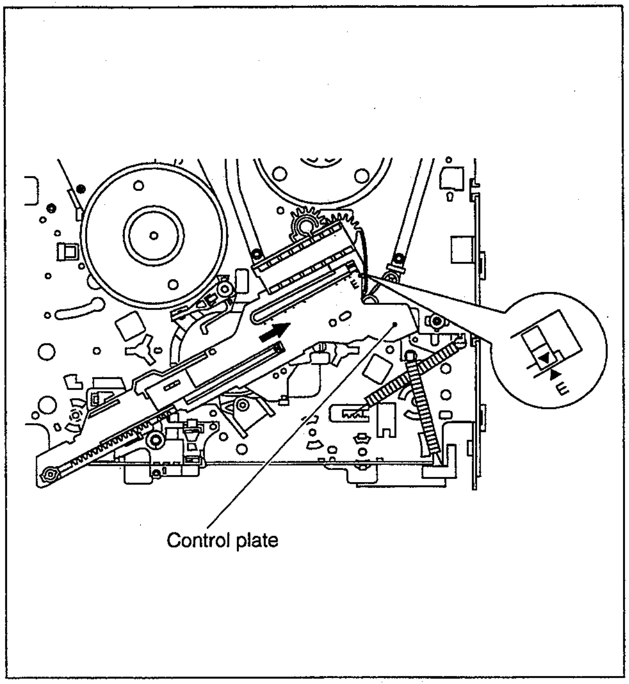


Fig. 2-3-2

2.3.4 Rotary Encoder

(1) Make sure that the mark E of the control plate is in alignment with the mark ▼ of the loading arm gear shaft and bring the register marks on the rotary encoder into alignment as indicated in Fig.2-3-3.
(2) Turn over the rotary encoder with its register marks kept in alignment and install it by fitting on the shaft of the rotary encoder guide and the positioning pin.
(3) Tighten the screw (A) to complete the installation.

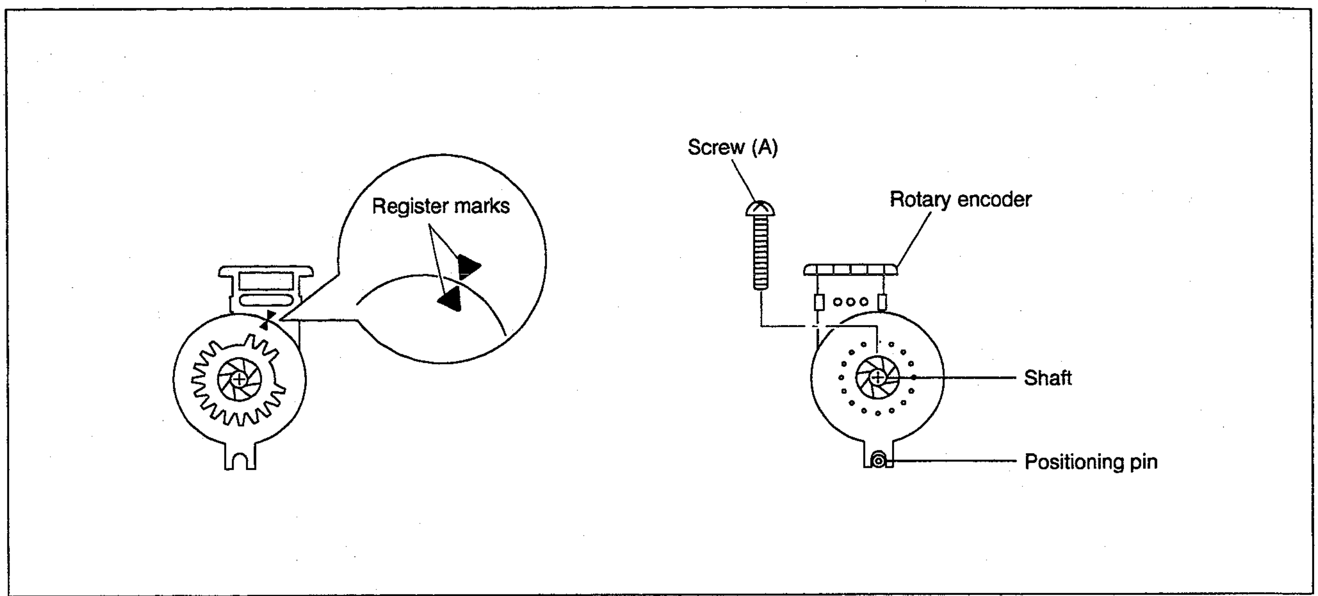

Register marks
Screw (A)
Rotary encoder
Shaft
Positioning pin

Fig. 2-3-3

2.3.5 Control Cam, Cassette Gear and Link Lever

(1) Install the control cam as indicated in Fig.2-3-4 making sure of the front and back side alignment.
Note here that the register hole of the control cam is in alignment with and allows passage through the register hole of the main deck. Perform fine-adjustment by turning the worm gear.

(2) Install the cassette gear by pushing it until it is locked with a clicking sound. (See Fig.2-3-4)

(3) Insert section (A) of the link lever into section (B) of the control plate as shown in Fig.2-3-5.

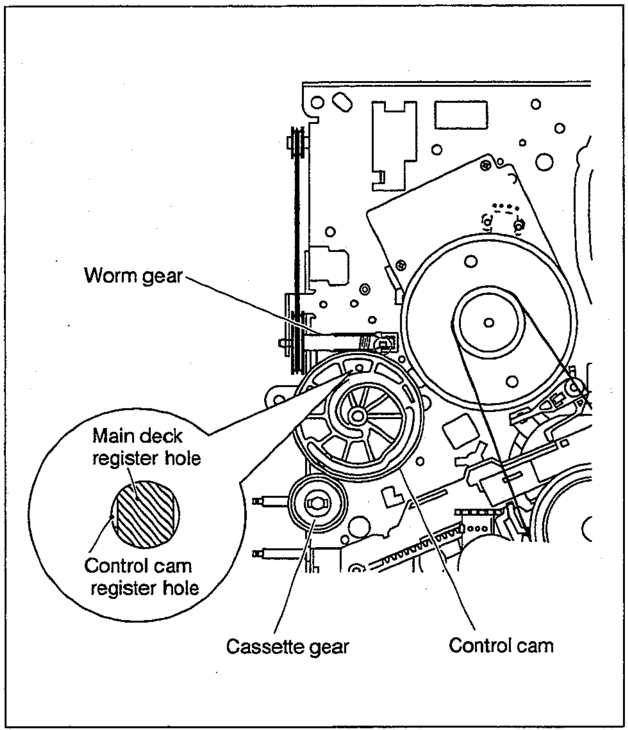

Worm gear
Main deck register hole
Control cam register hole
Cassette gear
Control cam

Fig. 2-3-4

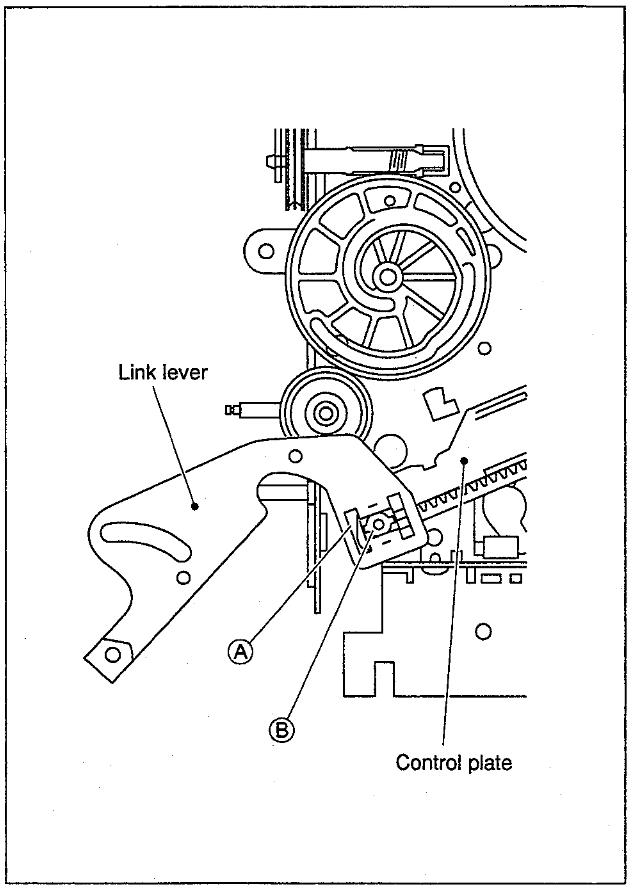

Link lever
Ⓐ
Ⓑ
Control plate

Fig. 2-3-5

(4) Turn the link lever clockwise and mount it on the control cam center shaft Ⓐ and the control cam left-side shaft Ⓑ. (See Fig.2-3-6).

(5) Fasten the slit washers at two points Ⓐ and Ⓑ.

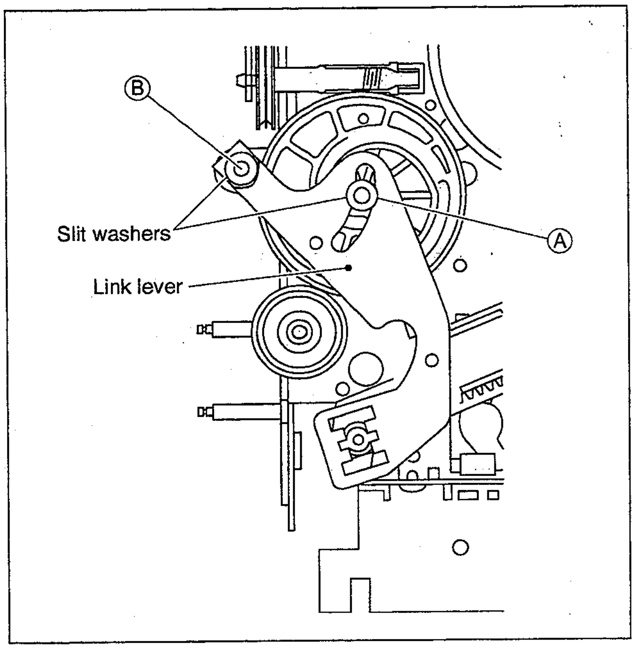


Fig. 2-3-6

2.3.6 Relay Gear, Limit Gear and Drive Gear

(1) Install the limit gear so that the notch at its outer circumference is in alignment with the register hole of the main deck.(See Fig.2-3-7)

(2) Install so that the notch at the outer circumference of the relay gear is in alignment with the notch of the main deck, and at the same time, that the hole A of the relay gear is in alignment with hole A of the limit gear and hole B of the relay gear with hole B of the drive gear. (See Fig.2-3-7)

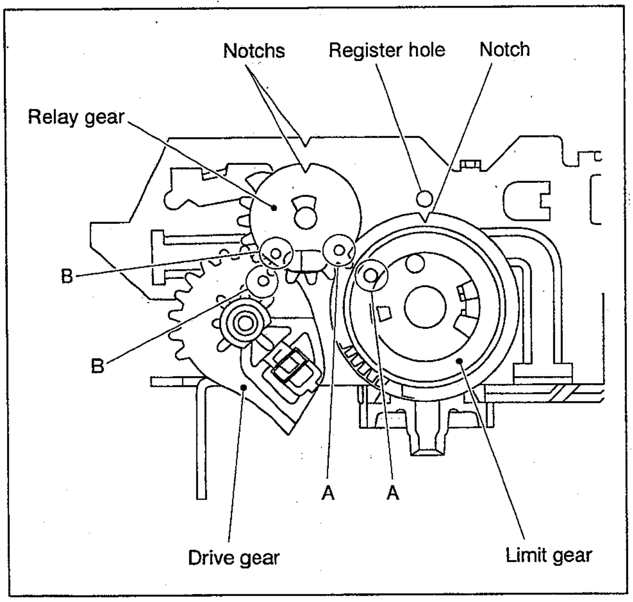


Fig. 2-3-7

2.4 COMPATIBILITY ADJUSTMENT

Notes:
- *Although compatibility adjustment is very important, it is not necessary to perform this as part of the normal servicing work. It will be required when you have replaced the audio control head, drum assembly or any part of the tape transport system.*
- *To avoid any damage to the alignment tape while performing the compatibility adjustment, get a separate cassette tape (for recording and play back) ready to be used for checking the initial tape running behavior.*

2.4.1 Checking/Adjustment of FM Waveform Linearity

(1) Connect the oscilloscope to TP106(PB FM/COL) of the main board assembly and to TP111(D.FF) of the main board assembly for external sync connection.

(2) Playing the alignment tape MHPE, observe the FM waveform.

(3) Press the channel buttons (+) and (–) buttons simultaneously during playback to enter the manual tracking mode (This also brings tracking to the center.)

(4) Make sure that there is no significant level drop of the FM waveform caused by the tracking operation, with its generally parallel and linear variation ensured. Perform the following adjustments when required. (Fig.2-4-1)

(5) Slightly loosen the set screw under the pole base assembly with a 1.25 mm hexagonal wrench (Take care not to loosen too much). (Fig.2-4-2)

(6) Reduce the FM waveform while pressing the channel buttons (+, –) during playback. If a drop in level is found on the left side as shown in Fig.2-4-3, turn the guide roller of the pole base assembly (supply side) with the roller driver (PTU94002) to make the FM waveform linear.
If a drop in level is on the right side, likewise turn the guide roller of the pole base assembly (take-up side) with the guide roller to make it linear. (Fig.2-4-3)

(7) Then play MHPE-L and make sure that the FM waveform varies in parallel and linearly with the tracking operation. When required, perform fine-adjustment of the guide roller of the pole base assembly (supply or take-up side).

(8) After adjustment, tighten the set screw under the pole base assembly. (Take care not to tighten too much)

(9) After tightening the set screw, play the alignment tape MHPE and MHPE-L again to make sure that the FM waveform has correct variation.

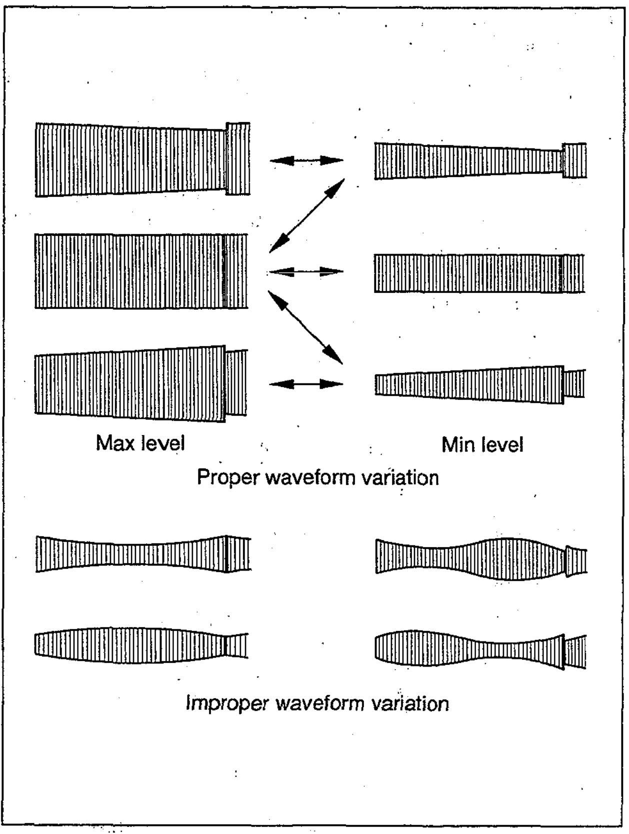

Max level
Min level
Proper waveform variation
Improper waveform variation

Fig. 2-4-1

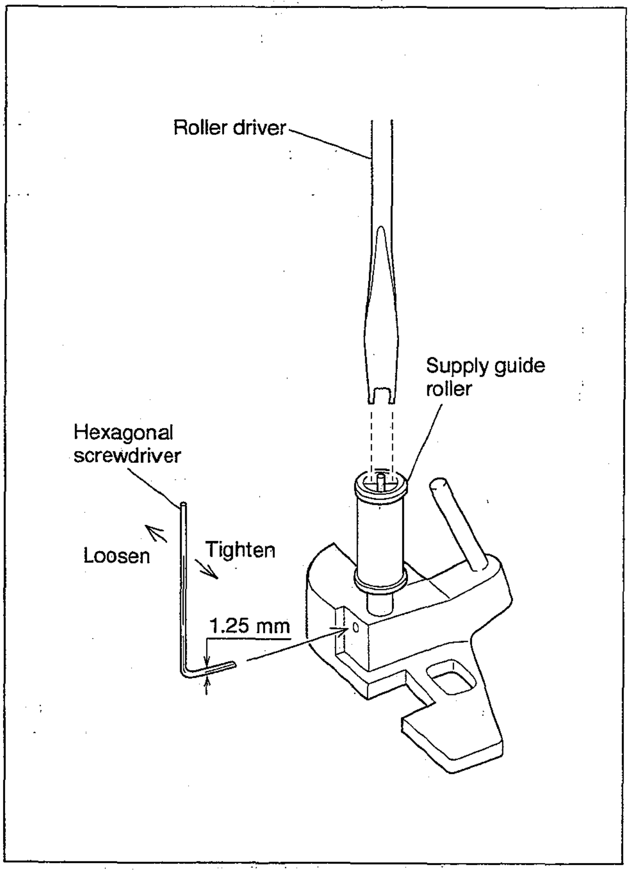

Roller driver
Supply guide roller
Hexagonal screwdriver
Loosen
Tighten
1.25 mm

Fig. 2-4-2

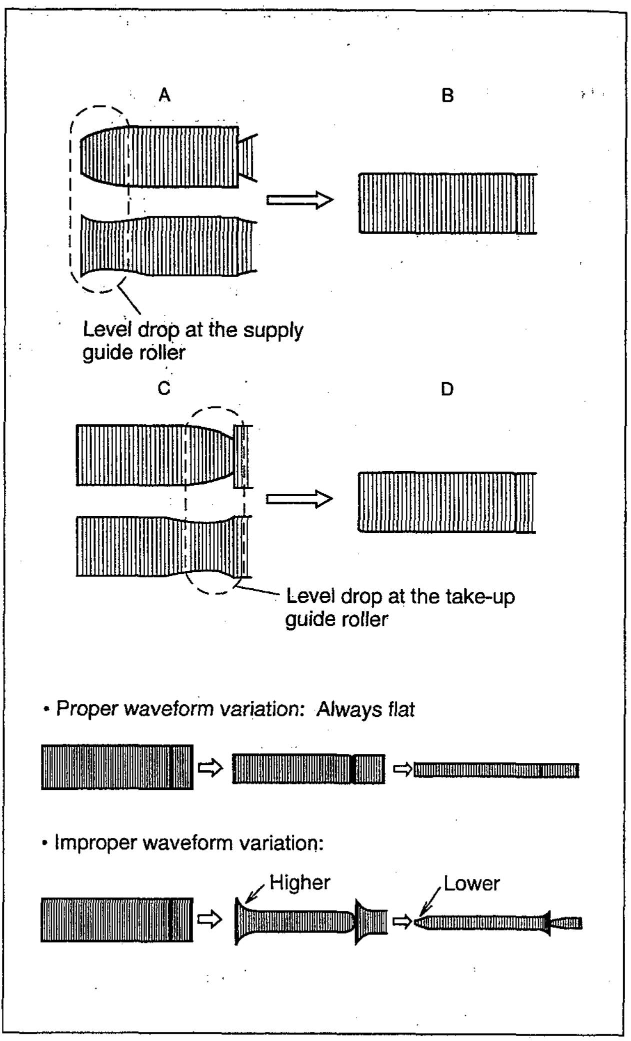

A
B
Level drop at the supply guide roller
C
D
Level drop at the take-up guide roller
• Proper waveform variation: Always flat
• Improper waveform variation:
Higher
Lower

Fig. 2-4-3

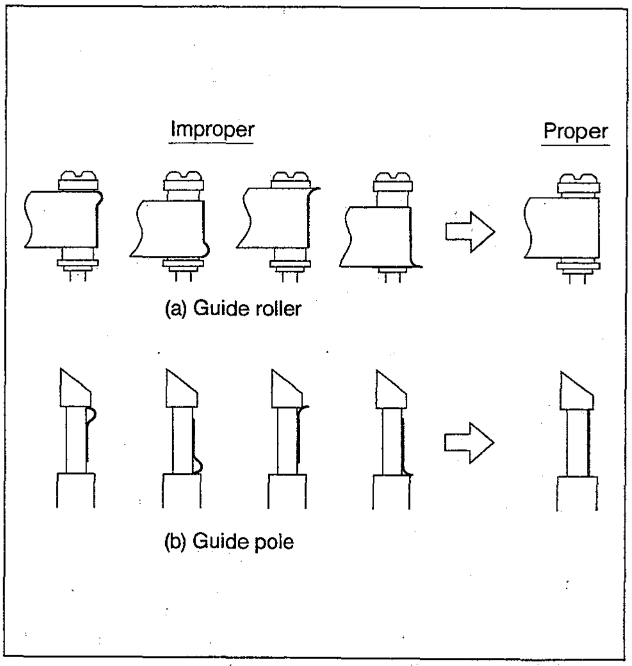

Improper
Proper
(a) Guide roller
(b) Guide pole

Fig. 2-4-4

2.4.2 Checking/Adjustment of the Height and Tilt of the Audio Control Head

Note: *Set a temporary level of the height of the A/C head in advance to make the adjustment easier. (See Fig.2-2-14)*

(1) Connect CH-1 of the oscilloscope to AUDIO OUT and CH-2 to TP4001 (CTL P) of the main board and observe the waveforms on both channels in the ALT mode.
(2) Play the alignment tape MHPE and adjust it by turning screws (1), (2) and (3) little by little until the waveform of both the audio output signal and the control pulse reach maximum. Screw (1) and screw (3) are for adjustment of tilt and screw (2) for azimuth.

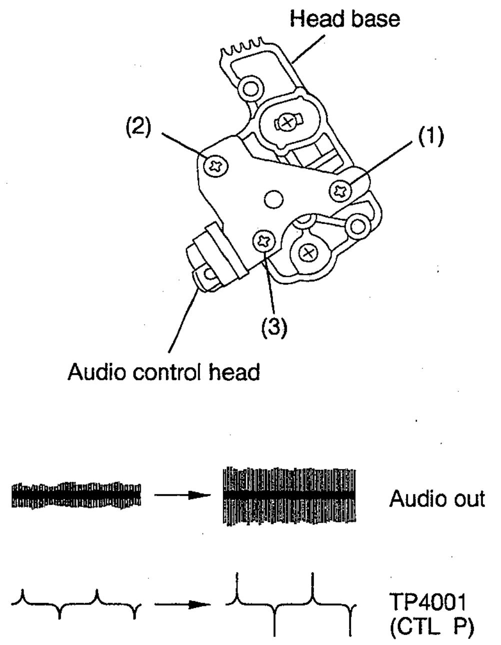


Fig. 2-4-5

2.4.3 Checking/Adjustment of the Audio Control Head Phase (X-Value)

(1) Connect the oscilloscope to TP106(PB FM/COL) of the main board assembly and to TP111(D.FF) of the main board assembly for external sync connection.
(2) Play the alignment tape MHPE and observe the FM waveforms.
(3) Press the channel buttons (+) and (–) buttons simultaneously during playback to enter the manual tracking mode (This also brings tracking to the center.)
(4) Loosen screws (4) and (5) so that the A/C head position bit (PTU94010) is set as indicated in Fig.2-4-6.
(5) Turn the A/C head position and first move the audio control head fully up to the capstan head. Then gradually return the audio control head toward the drum and stop it where the FM waveform reaches its maximum for the first time. Then tighten screw (4) temporarily.
(6) Then play the alignment tape MHPE-L.
(7) Press the channel buttons (+) and (–) buttons simultaneously during playback to enter the manual tracking mode (This also brings the tracking to the center.)
(8) Perform the tracking operation and make sure that the FM waveform is at its maximum.
(9) If it is not at maximum, loosen the temporarily tightened screw (4) and turn the A/C head position bit to bring the audio control head to a position, around where the waveform reaches its maximum for the first time. Then tighten screws (4) and (5).

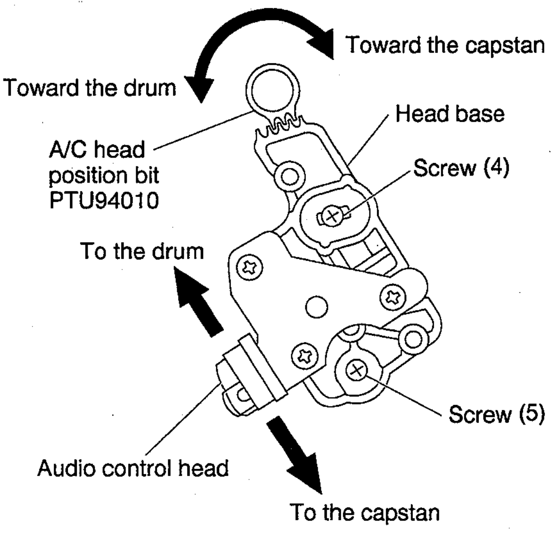


Fig. 2-4-6

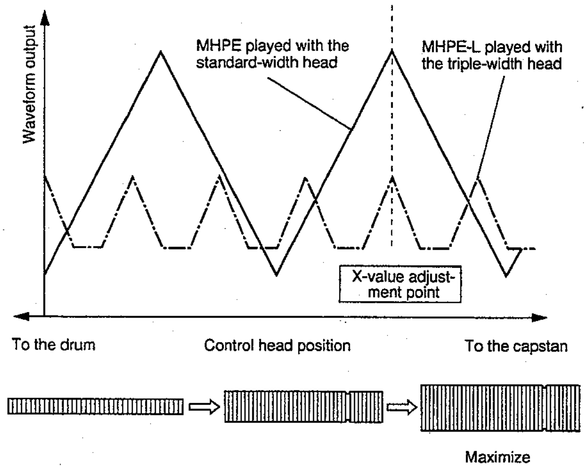


Fig. 2-4-7

2.4.4 Checking the LP mode Auto Tracking

Note: *Set the remote control cable of the video recorder to A mode.*
(The unit set in B mode does not accept the remote control cable of the presetting unit.)

(1) Connect the oscilloscope to TP106(PB FM/COL) of the main board assembly and to TP111(D.FF) of the main board assembly for external sync connection.
(2) Playing the alignment tape MHPE and observing the FM waveform, make sure that the auto tracking operation is complete.
(3) Press the button "D" of the presetting unit twice.
(4) Make sure that the MHPE-L is not ejected.
(5) If ejected, again perform the phase (X-value) adjustment of the audio control head.

2.4.5 Checking/Adjustment of the Tension Pole

(1) Check the back tension cassette gauge (PUJ48076-2) to make sure that the indicator points to 29 - 46 g-cm.
(2) If the indicated value is outside this range, carry out the following adjustment steps.
    1) Select the mechanism servicing mode. (See 1.5 MECHANISM SERVICE MODE)
    2) While in the Play mode, turn the adjustment pin with a straight-slot screwdriver while taking care not to touch the 2.5 mm dia. pole. (See Fig.2-4-8).

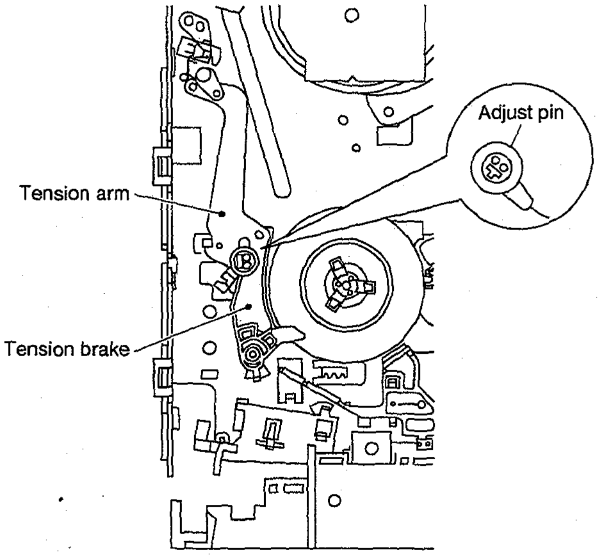


Fig. 2-4-8

2.4.6 Adjustment of the Tension Stud

(1) Adjust so that the left side of the tension stud is on the extension of the notch line of the main deck as indicated in Fig.2-4-9.

Note: *Adjustment is not usually necessary for the tension stud. Perform this adjustment only when it is out of position.*

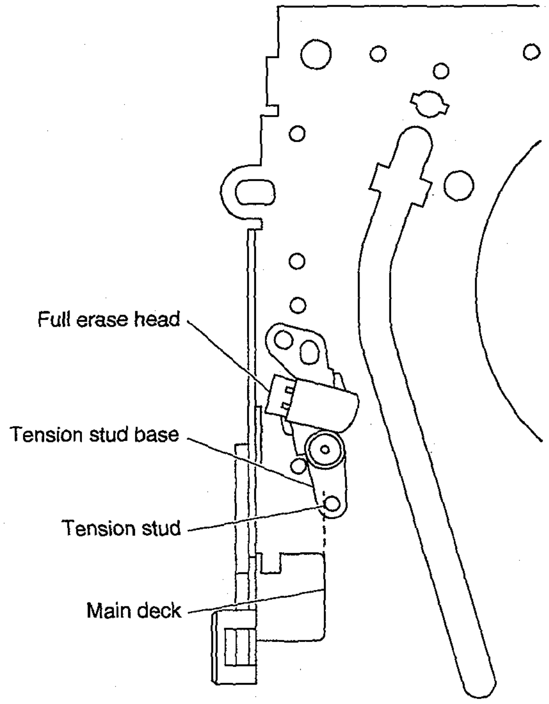


Fig. 2-4-9

2.4.7 Main Brake Torque Adjustment

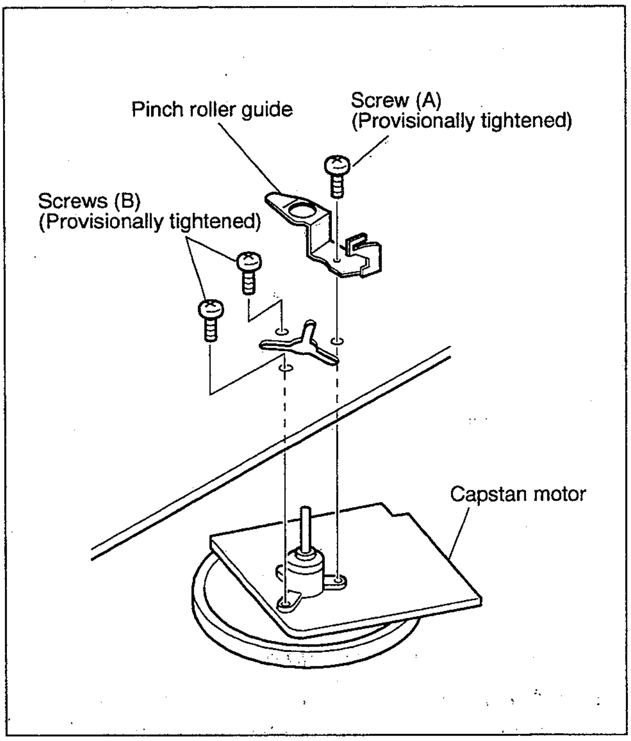
Note: Adjustment of the main brake torque is required after the adjustment pin has been removed or the main brake or the reel base on the supply or take-up side have been replaced, removed or attached.

(1) Rotate the pulley of the loading motor by hand to align the mark ▼ on the loading arm gear shaft with the ST marking on the control plate (i.e. set to the STOP mode position).
(2) Insert a torque gauge (PUJ48075-2) into the reel base on the side to be played, hold the torque gauge lightly, rotate it clockwise when measuring the supply side torque or counterclockwise when measuring the take-up side torque, and read the value indicated at the moment the reel base starts to slip.
(3) Make sure that the main brake torque values on the supply and take-up sides are both between $39.^2$ — $78.^4$ x 10^{-3} N-m (400 — 800 gf-cm). If the value is outside the specified range, adjust to the specified value by rotating the adjustment pin.
If an adjustment by using the adjustment pin is not possible, replace the main brake.

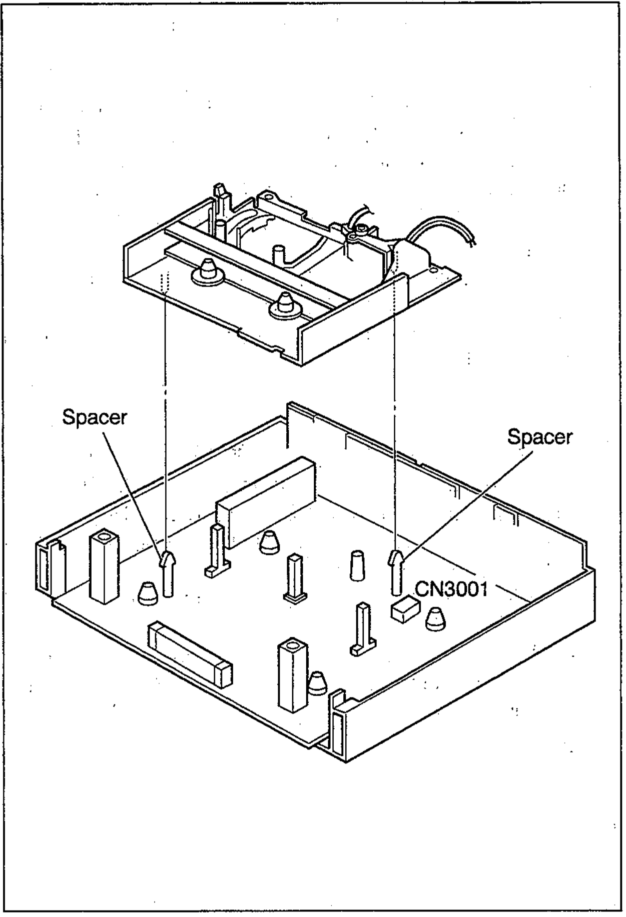
How to Mount the Capstan Motor (Centering the Mounting Position)

When the capstan motor has once been removed and then reinstalled out of the initial correct position in the rotational direction, the capstan motor current may be unstable during operation in high or low temperatures. This may result in greater Wow & Flutter and occasionally in power breakdown because of current over - load. Install the capstan motor while following the procedure given below.
(The capstan motor is centrally located when the unit is shipped from the factory.)

1. Provisionally tighten one screw (A) together the pinch roller guide and the two screws (B) securing the capstan motor.



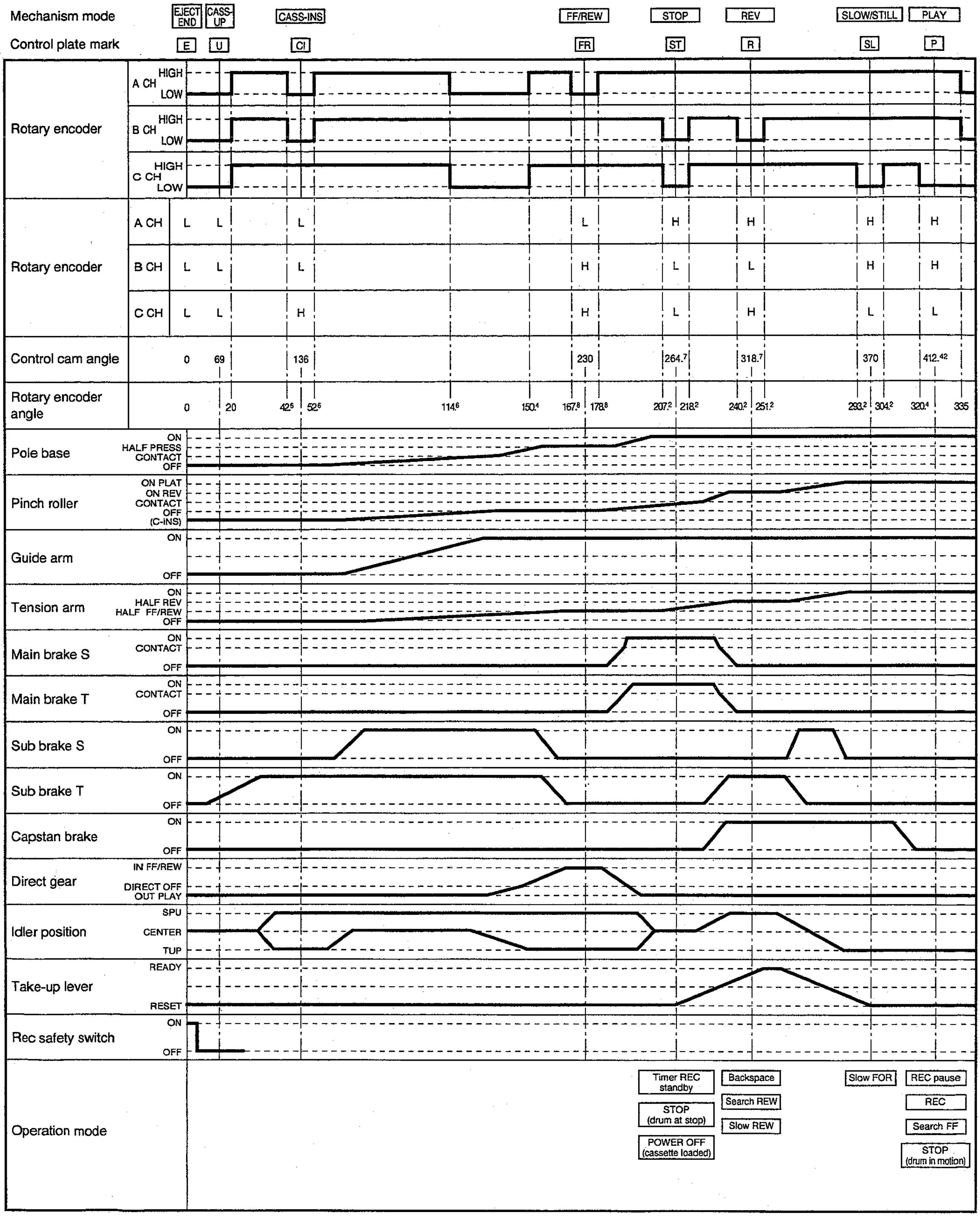
2. Install the mechanism to which the capstan motor is provisionally fastened on the bottom chassis which incorporates the Main board assembly. (No need to tighten the screws for mounting the mechanism)
   Make sure that all the connectors for the mechanism and the Main board are correctly installed.



3. Securely tighten the three screws (A), especially making sure that the connector CN3001 of the capstan motor is correctly mounted.

Note: ***When the capstan motor has been replaced with a new one, perform recording in the LP mode for at least 2 minutes at normal temperatures immediately before starting the FF/REW or SEARCH operations (Aging).***

Mechanism Timing Chart


Mechanism mode
EJECT END
CASS-UP
CASS-INS
FF/REW
STOP
REV
SLOW/STILL
PLAY
Control plate mark
E
U
CI
FR
ST
R
SL
P
Rotary encoder
A CH
B CH
C CH
HIGH
LOW
L
H
Control cam angle
0
69
136
230
264.7
318.7
370
412.42
Rotary encoder angle
0
20
42.5
52.6
114.6
150.4
167.8
178.8
207.2
218.2
240.2
251.2
293.2
304.2
320.4
335
Pole base
ON
HALF PRESS
CONTACT
OFF
Pinch roller
ON PLAT
ON REV
CONTACT
OFF (C-INS)
Guide arm
ON
OFF
Tension arm
ON
HALF REV
HALF FF/REW
OFF
Main brake S
ON
CONTACT
OFF
Main brake T
ON
CONTACT
OFF
Sub brake S
ON
OFF
Sub brake T
ON
OFF
Capstan brake
ON
OFF
Direct gear
IN FF/REW
DIRECT OFF
OUT PLAY
Idler position
SPU
CENTER
TUP
Take-up lever
READY
RESET
Rec safety switch
ON
OFF
Operation mode
Timer REC standby
STOP (drum at stop)
POWER OFF (cassette loaded)
Backspace
Search REW
Slow REW
Slow FOR
REC pause
REC
Search FF
STOP (drum in motion)

SECTION 3
ELECTRICAL ADJUSTMENT

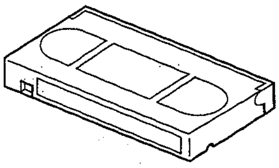
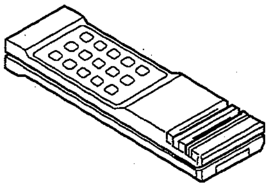
3.1 PRECAUTION

Electrical adjustment are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also do not attempt these adjustments unless the proper equipments is available.

3.1.1 Required test equipment

① Colour television or monitor
② Oscilloscope: wide-band,dual-trace,triggered delayed sweep
③ Frequency counter
④ Digital voltmeter
⑤ Signal generator: RF/IF sweep/marker
⑥ Signal generator: PAL/NTSC colour bar, stairstep
⑦ Recording tape
⑧ Numeric-key remote controller(provided)

3.1.2 Required adjustment tools

Alignment tape (SP,stairstep) MHPE	Presetting unit PTU94008
	

> **Note:**
> *The system control circuit of this model has an automatic recognition about the ON-OFF control of the **DOCTOR SYSTEM**.*

3.1.3 Colour bar signal,colour bar pattern

- PAL colour bar signal

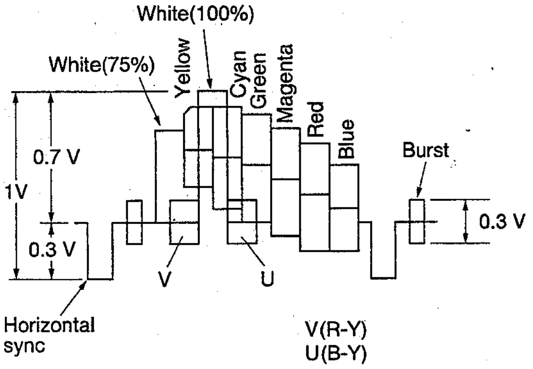

White(100%)
White(75%)
Yellow
Cyan
Green
Magenta
Red
Blue
Burst
0.7 V
1V
0.3 V
0.3 V
V
U
Horizontal sync
V(R-Y)
U(B-Y)

Fig.3-1-1 PAL colour bar signal waveform

- PAL colour bar pattern

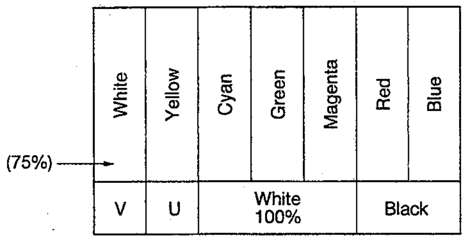

White
Yellow
Cyan
Green
Magenta
Red
Blue
(75%)
V
U
White 100%
Black

Fig.3-1-2 PAL colour bar pattern

- NTSC colour bar signal

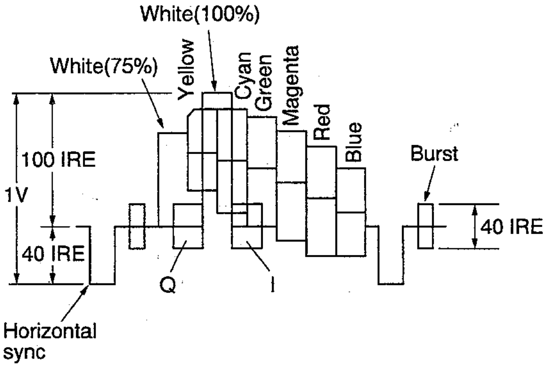

White(100%)
White(75%)
Yellow
Cyan
Green
Magenta
Red
Blue
Burst
100 IRE
1V
40 IRE
40 IRE
Q
I
Horizontal sync

Fig.3-1-3 NTSC colour bar signal waveform

- NTSC colour bar pattern

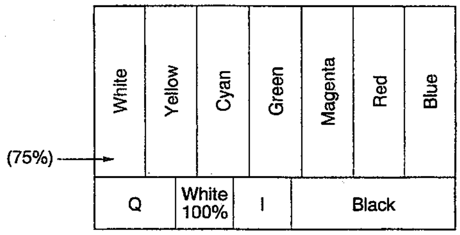

White
Yellow
Cyan
Green
Magenta
Red
Blue
(75%)
Q
White 100%
I
Black

Fig.3-1-4 NTSC colour bar pattern

3.2 SERVO CIRCUIT

Notes:
- *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*
- *Set VCR to the mode A by remote controller.*
- *Use only buttons "O", depressing other buttons during adjustment may cause adjustment errors.*

3.2.1 PB switching point

Signal	• Alignment tape [MHPE],Stairstep
Mode	• PB
Equipment	• Oscilloscope
Specification	• STOP mode

(1) Playback the stairstep signal of the alignment tape.

(2) Press the "O" button of the presetting unit.

(3) The adjustment is performed automatically.
Once the adjustment is performed, the VCR will go into the STOP mode.

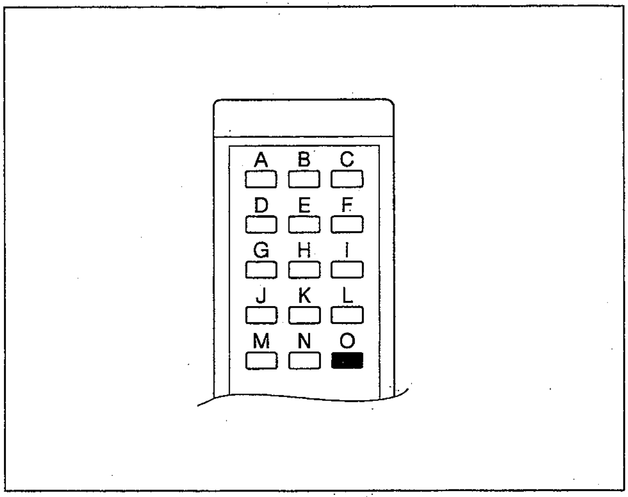


Fig.3-2-1 Presetting unit

3.2.2 Slow tracking preset

Signal	• Colour bar (PAL, NTSC)
Mode	• SP/LP: PAL REC → PB(SLOW) • SP/EP: NTSC
Equipment	• TV-Monitor
Adjustment tool	• Presetting unit [PTU94008]
Specification	• Minimum noise

Note : *Set VCR to the mode A by remote controller. Use only buttons "B" and "C", depressing other buttons during adjustment may cause adjustment errors.*

(1) Record a colour bar signal in the SP mode.
(2) Playback recorded signal on the FWD slow mode.
(3) Observe the display on the TV monitor and adjust for optimum noise condition (best tracking) by depressing "B " or "C" buttons of the presetting unit.
(4) Depress the STOP button.
(5) Confirm that the bar noise is not visible on the TV monitor in the slow mode.
(6) Record a colour bar signal in the LP mode.
(7) Repeat steps (2) to (5) in the FWD slow mode.
(8) Repeat steps (2) to (5) in the REV slow mode.
(9) Repeat steps (1) to (8) in the NTSC mode.

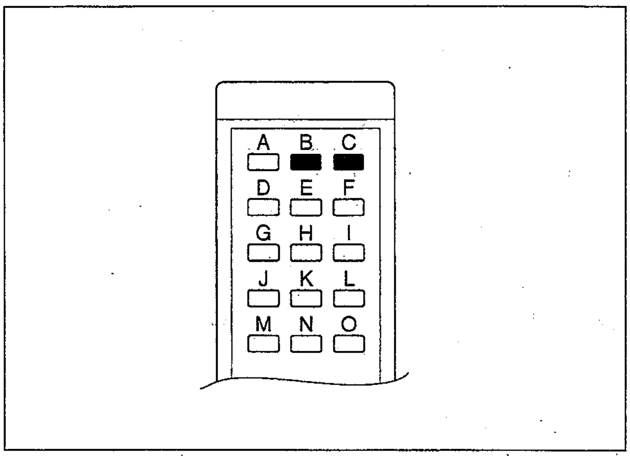


Fig.3-2-2 Presetting unit

3.3 VIDEO CIRCUIT

Notes: • *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*

- *Set VCR to the mode A by remote controller.*

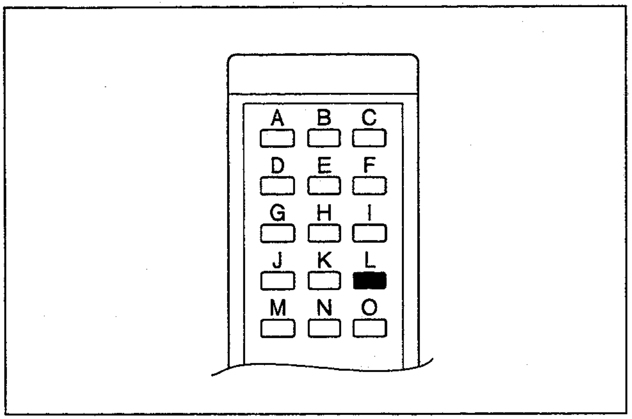


Fig.3-3-1 Presetting unit

3.3.1 Auto picture

Signal	• Monoscope
Mode	• REC then PB • SP/LP: PAL • SP/EP: NTSC • BEST: OFF
Adjustment tool	• Presetting unit[PTU94008]
Specification	• STOP mode

(1) Set B.E.S.T feature to OFF on MENU screen.
(2) Record a monoscope signal in the SP mode.
(3) Playback the recorded signal.
(4) Press the "L" button of the presetting unit during playback.
(5) Confirm that VCR will go into the STOP mode.
(6) Repeat steps (2) to (5) in the LP mode.
(7) Repeat steps (2) to (6) in the NTSC mode.

3.4 SYSCON CIRCUIT

Notes: • *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*

- *When perform this adjustment,remove the MECHANISM assembly.*

3.4.1 Timer clock

Signal	• No signal
Mode	• EE
Equipment	• Frequency counter
Measurement point	• TL3001 round (SYS. CLK)
Adjustment part	• C3018 (TIMER CLOCK)
Specification	• 1024.008 ± 0.001 Hz [976.5549 ± 0.0010 µsec.]

(1) Connect the frequency counter to TL3001(SYS.CLK) round and GND.
(2) Connect the short wire between TL3003(TEST) round and Vcc(5V).
(3) Short the leads of capacitor C3015 once in order to reset the IC3001.
(4) Disconnect the short wire between TL3003 and Vcc (5 V) then connect it again quickly.
(5) Adjust the C3018 trimmer capacitor so that the output from TL3001(SYS.CLK) falls within the 1024.008 ± 0.001 Hz (976.5549 ± 0.0010 µsec.) range.

3.5 ON SCREEN CIRCUIT

Notes: • *Unless otherwise specified, all measurement point and adjustment parts are located on the MAIN BOARD.*

- *Set VCR to the mode A by remote controller.*

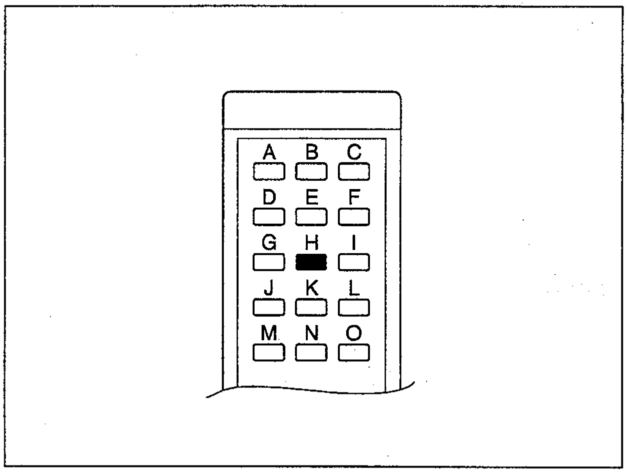


Fig.3-5-1 Presetting unit

3.5.1 Character position

Signal	• No signal
Mode	• EE
Equipment	• TV-monitor
Adjustment tool	• Presetting unit
Specification	• Character centre

(1) Press the MENU button and display the on screen character.
(2) Adjust "H" button on the presetting unit so that the character is centre position.

SECTION 4
CHARTS AND DIAGRAMS

NOTES OF SCHEMATIC DIAGRAM

Safety precautions
The Components identified by the symbol ⚠ are critical for safety. For continued safety, replace safety critical components only with manufacturer's recommended parts.

1. Units of components on the schematic diagram

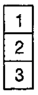
Unless otherwise specified.

1) All resistance values are in ohm, 1/6 W, 1/8 W (refer to parts list).
   Chip resistors are 1/16 W.
   K: KΩ (1000Ω), M: MΩ (1000KΩ)
2) All capacitance values are in µF, (P: PF).
3) All inductance values are in µH, (m: mH).
4) All diodes are 1SS133, MA165 or IN4148M (refer to parts list).

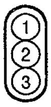
2. Indications of control voltage

AUX : Active at high
$\overline{\text{AUX}}$ or AUX(L) : Active at low

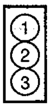
3. Interpreting Connector indications



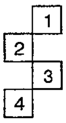
Removable connector



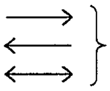
Wire soldered directly on board



Non-removable Board connector



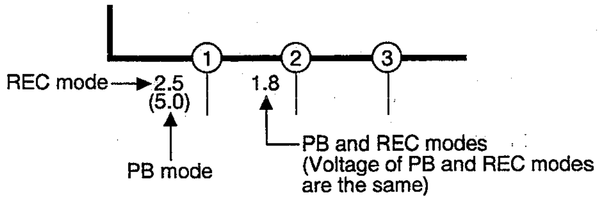
Board to Board



Connected pattern on board
The arrows indicate signal path

4. Voltage measurement

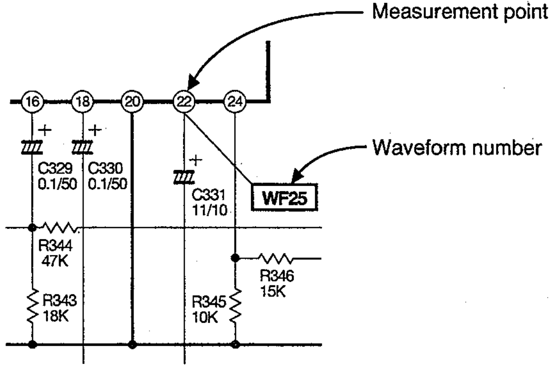
1) Video circuits
   REC : Colour bar signal in SP mode, normal VHS mode
   PB : Alignment tape, colour bar SP mode, normal VHS mode
   — : Unmeasurable or unnecessary to measure
2) Audio circuits
   REC : 1KHz, –8 dBs sine wave signal in SP mode, Normal VHS mode
   PB : REC then playback it
3) Movie Camera circuits
   Measured using a correctly illuminated gray scale or colour bar test charts in the E-E mode
4) Indication on schematic diagram
   Voltage Indications for REC and PB mode on the schematic diagram are as shown below.


1
2
3
REC mode
2.5
(5.0)
1.8
PB mode
PB and REC modes
(Voltage of PB and REC modes are the same)

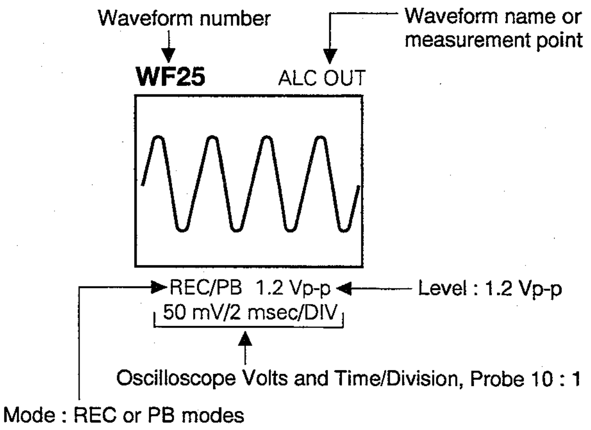
Note: If the voltages are not indicated on the schematic diagram, refer to the voltage charts.

5. Waveform measurement

1) Video circuits
   REC : Colour bar signal in SP mode, normal VHS mode
   PB : Alignment tape, colour bar SP mode, normal VHS mode
2) Audio circuits
   REC : 1KHz, –8 dBs sine wave signal in SP mode, normal VHS mode
   PB : REC then playback it
3) Movie Camera circuits
   Measured using a correctly illuminated gray scale or colour bar test chatrs in the E-E mode
4) Indication on schematic diagram
   Waveform indications on the schematic diagram are as shown below.


Measurement point
16
18
20
22
24
C329
0.1/50
C330
0.1/50
C331
11/10
Waveform number
WF25
R344
47K
R346
15K
R343
18K
R345
10K

5) Waveform indications


Waveform number
Waveform name or measurement point
WF25
ALC OUT
REC/PB 1.2 Vp-p
Level : 1.2 Vp-p
50 mV/2 msec/DIV
Oscilloscope Volts and Time/Division, Probe 10 : 1
Mode : REC or PB modes

6. Signal path Symbols

The arrows indicate the signal path as follows.

⇨ Playback signal path

▭▶ Playback and recording signal path

➡ Recording signal path
(including E-E signal path)

⇨▷ Capstan servo path

➡▶ Drum servo path

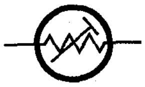
(Example)

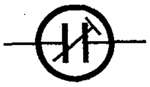
⇨ R-Y Playback R-Y signal path

➡ Y Recording Y signal path

7. Indication of the parts for adjustments

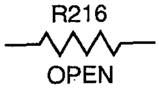
The parts for the adjustments are surrounded with the circle as shown below.





8. Indication of the parts not mounted on the circuit board

"OPEN" is indicated by the parts not mounted on the circuit board.



CIRCUIT BOARD NOTES

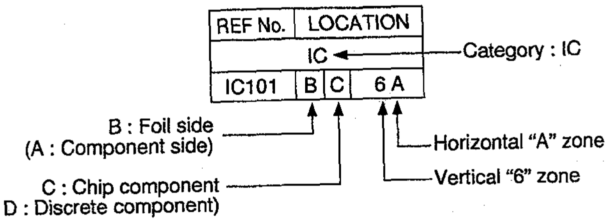
1. Foil and Component sides

1) Foil side (B side) :
Parts on the foil side seen from foil face (pattern face) are indicated.

2) Component side (A side) :
Parts on the component side seen from component face (parts face) indicated.

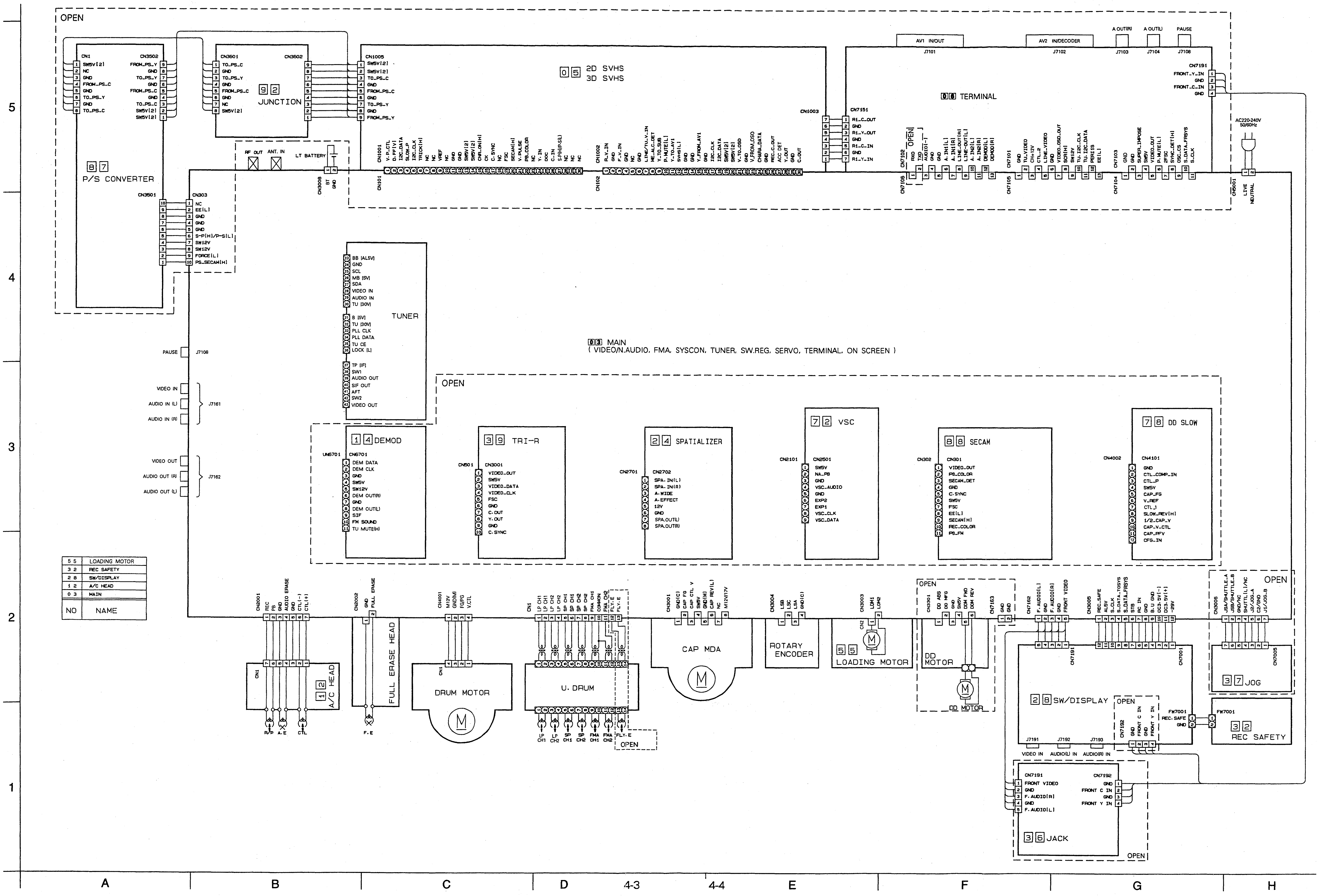
2. Parts location guides

Parts location are indicated by guide scale on the circuit board.


REF No.
LOCATION
IC
IC101
B
C
6 A
Category : IC
B : Foil side
(A : Component side)
C : Chip component
D : Discrete component)
Horizontal "A" zone
Vertical "6" zone

Note:
For general information in service manual, please refer to the Service Manual of GENERAL INFORMATION Edition 4 No. 82054D (January 1994).

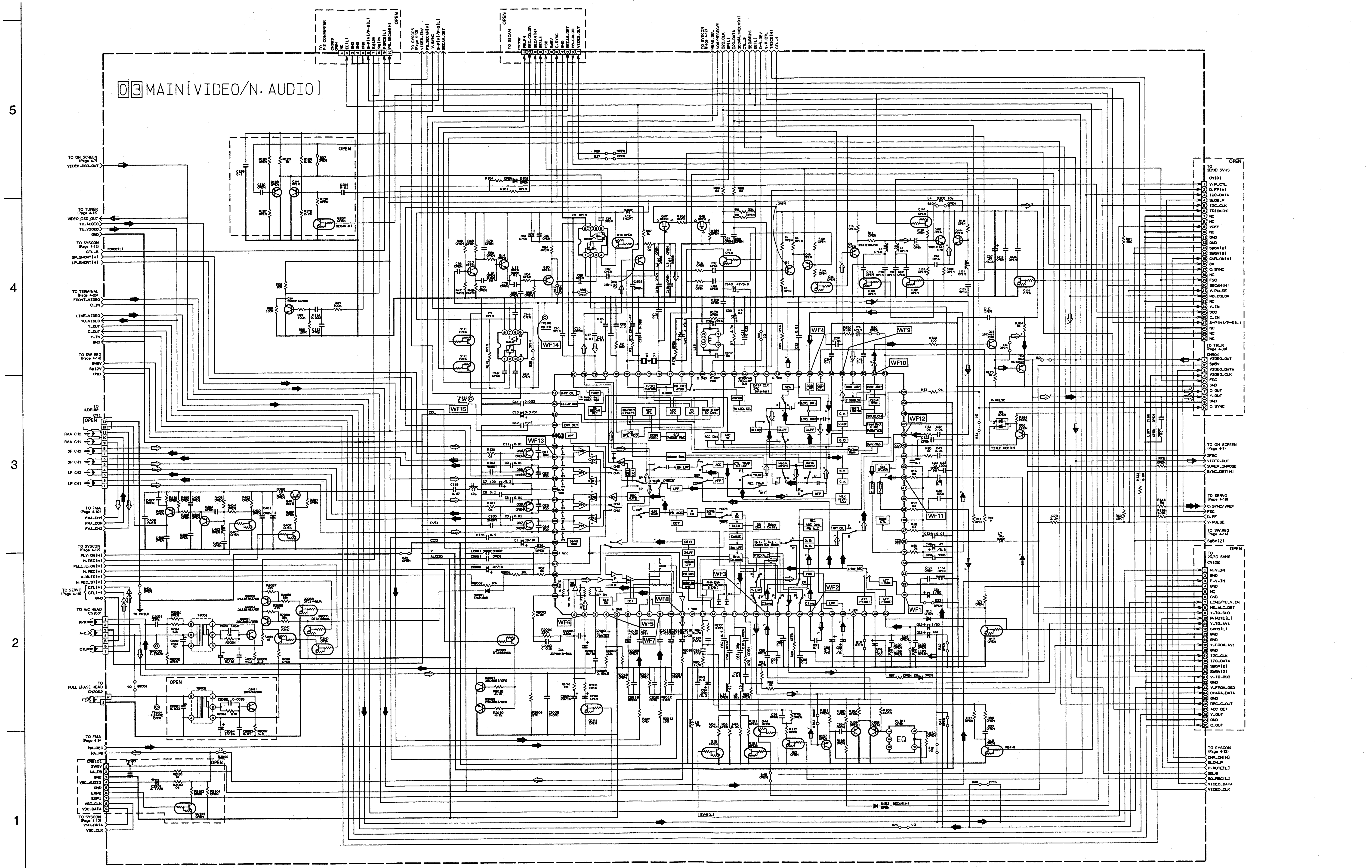
4.1 BOARD INTERCONNECTIONS



OPEN
8 7 P/S CONVERTER
CN1
CN3502
CN3501
CN303
9 2 JUNCTION
CN3601
CN3602
0 5 2D SVHS 3D SVHS
CN1005
CN1003
CN1001
CN1002
CN101
CN102
0 6 TERMINAL
AV1 IN/OUT
AV2 IN/DECODER
A OUT(R)
A OUT(L)
PAUSE
J7101
J7102
J7103
J7104
J7108
CN7151
CN7191
CN7102
CN7106
CN7101
CN7105
CN7103
CN7104
CN5001
AC220-240V 50/60Hz
LIVE
NEUTRAL
RF OUT
ANT. IN
LT BATTERY
CN3008
TUNER
0 3 MAIN
(VIDEO/N.AUDIO, FMA, SYSCON, TUNER, SW.REG, SERVO, TERMINAL, ON SCREEN)
PAUSE
VIDEO IN
AUDIO IN (L)
AUDIO IN (R)
J7161
VIDEO OUT
AUDIO OUT (R)
AUDIO OUT (L)
J7162
1 4 DEMOD
CN6701
3 9 TRI-R
CN501
CN3001
2 4 SPATIALIZER
CN2701
CN2702
7 2 VSC
CN2101
CN2501
8 8 SECAM
CN302
CN301
7 8 DD SLOW
CN4002
CN4101
CN2001
CN2002
CN4001
CN3004
CN3003
CN3301
CN7163
CN7162
CN3005
CN3006
1 2 A/C HEAD
R/P
A.E
CTL
FULL ERASE HEAD
F.E
DRUM MOTOR
U. DRUM
LP CH1
LP CH2
SP CH1
SP CH2
FMA CH1
FMA CH2
FLY.E
CAP MDA
ROTARY ENCODER
5 5 LOADING MOTOR
DD MOTOR
2 8 SW/DISPLAY
CN7001
CN7005
J7191
J7192
J7193
VIDEO IN
AUDIO(L) IN
AUDIO(R) IN
CN7192
FW7001
REC. SAFE
3 7 JOG
3 2 REC SAFETY
3 6 JACK
CN7191
CN7192
FRONT VIDEO
F. AUDIO(R)
F. AUDIO(L)
FRONT C IN
FRONT Y IN
A
B
C
D
E
F
G
H
1
2
3
4
5

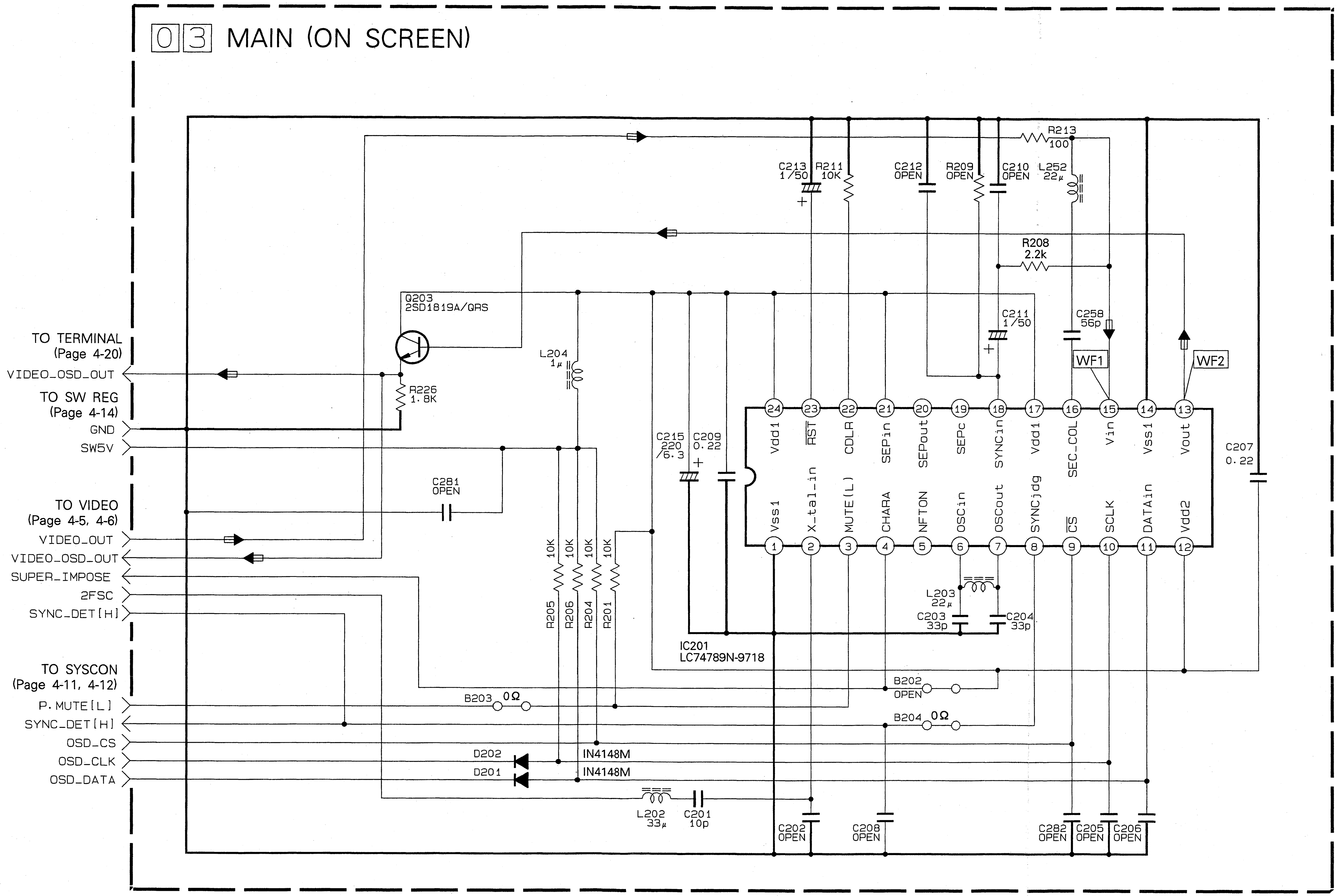
NO	NAME
5 5	LOADING MOTOR
3 2	REC SAFETY
2 8	SW/DISPLAY
1 2	A/C HEAD
0 3	MAIN

4.2 VIDEO/N.AUDIO SCHEMATIC DIAGRAM


03 MAIN[VIDEO/N. AUDIO]
TO P-S CONVERTER
CN303 OPEN
NC
EE(L)
GND
GND
GND
S-P(H)/P-S(L)
SW12V
SW12V
FORCE(L)
PB_SECAM(H)
OPEN
TO SYSCON (Page 4-12)
VIDEO_ENV
PB_SECAM(H)
V. SYNC
S-P(H)/P-S(L)
SECAM_DET
OPEN
TO SECAM
CN302
PB_FM
REC_COLOR
SECAM(H)
EE(L)
FSC
SW5V
C. SYNC
GND
SECAM_DET
PB_COLOR
VIDEO_OUT
TO SYSCON (Page 4-12)
HEAD_SEL
NOM/MESEC/S
I2C_CLK
SP(L)
I2C_DATA
SECAM_TRICK(H)
CTL_2
SECAM(H)
EE(L)
R-Y_REV
V.P_CTL
TRICK(H)
CTL_1
TO ON SCREEN (Page 4-7)
VIDEO_OSD_OUT
TO TUNER (Page 4-16)
VIDEO_OSD_OUT
TU_AUDIO
TU_VIDEO
GND
TO SYSCON (Page 4-12)
FORCE(L)
CTL_5
SP_SHORT(H)
LP_SHORT(H)
TO TERMINAL (Page 4-20)
FRONT_VIDEO
C_IN
LINE_VIDEO
TU_VIDEO
Y_OUT
C_OUT
Y_IN
GND
TO SW REG (Page 4-14)
SW5V
SW12V
GND
TO U.DRUM
CN1
OPEN
FMA CH2
FMA CH1
SP CH2
SP CH1
LP CH2
LP CH1
TO FMA (Page 4-10)
FMA_CH1
FMA_COM
FMA_CH2
TO SYSCON (Page 4-12)
FLY. ON(H)
H. REC(H)
FULL_E_ON(H)
N. REC(H)
A. MUTE(H)
N. REC_ST(H)
TO SERVO (Page 4-18)
CTL(+)
CTL(-)
GND
TO SHILD
TO A/C HEAD
CN2001
P/R
A. E
CTL
TP2033 A. ERASE
TO FULL ERASE HEAD
CN2002
FE
0Ω
B2051
TP2034 F.ERASE OPEN
OPEN
TO FMA (Page 4-9)
NA_REC
NA_PB
CN2101
SW5V
NA_PB
GND
VSC_AUDIO
GND
EXP2
EXP1
VSC_CLK
VSC_DATA
TO SYSCON (Page 4-12)
VSC_DATA
VSC_CLK
OPEN
TO 2D/3D SVHS
CN101
V. P_CTL
D. FF(V)
I2C_DATA
SLOW_P
I2C_CLK
TRICK(H)
NC
NC
VREF
NC
GND
GND
SW5V(2)
SW5V(2)
CNR_ON(H)
CK
C. SYNC
NC
FSC
SECAM(H)
V. PULSE
PB_COLOR
NC
Y_IN
DOC
C_IN
S-P(H)/P-S(L)
NC
NC
NC
TO TRLR (Page 4-39)
CN501
VIDEO_OUT
SW5V
VIDEO_DATA
VIDEO_CLK
FSC
GND
C. OUT
Y. OUT
GND
C. SYNC
TO ON SCREEN (Page 4-7)
2FSC
VIDEO_OUT
SUPER_IMPOSE
SYNC_DET(H)
TO SERVO (Page 4-18)
C. SYNC/VREF
FSC
D. FF
V. PULSE
TO SW.REG (Page 4-14)
SW5V(2)
OPEN
TO 2D/3D SVHS
CN102
R_V_IN
GND
F_V_IN
GND
NC
GND
LINE/TU_V_IN
ME_ALC_DET
Y_TO_SUB
P. MUTE(L)
Y_TO_AV1
SVHS(L)
GND
GND
Y_FROM_AV1
GND
I2C_CLK
I2C_DATA
SW5V(2)
SW5V(2)
V_TO_OSD
GND
V_FROM_OSD
CHARA_DATA
GND
REC_C_OUT
ACC DET
Y_OUT
GND
C_OUT
TO SYSCON (Page 4-12)
CNR_ON(H)
SLOW_P
P. MUTE(L)
SB_G
SQ_REC(L)
VIDEO_DATA
VIDEO_CLK
IC1
WF1
WF2
WF3
WF4
WF5
WF6
WF7
WF8
WF9
WF10
WF11
WF12
WF13
WF14
WF15
EQ
5
4
3
2
1
2
A
B
C
D
E
F
G
H

NOTE : For VIDEO, PRE/REC and AUDIO waveforms, please refer to page 4-24.

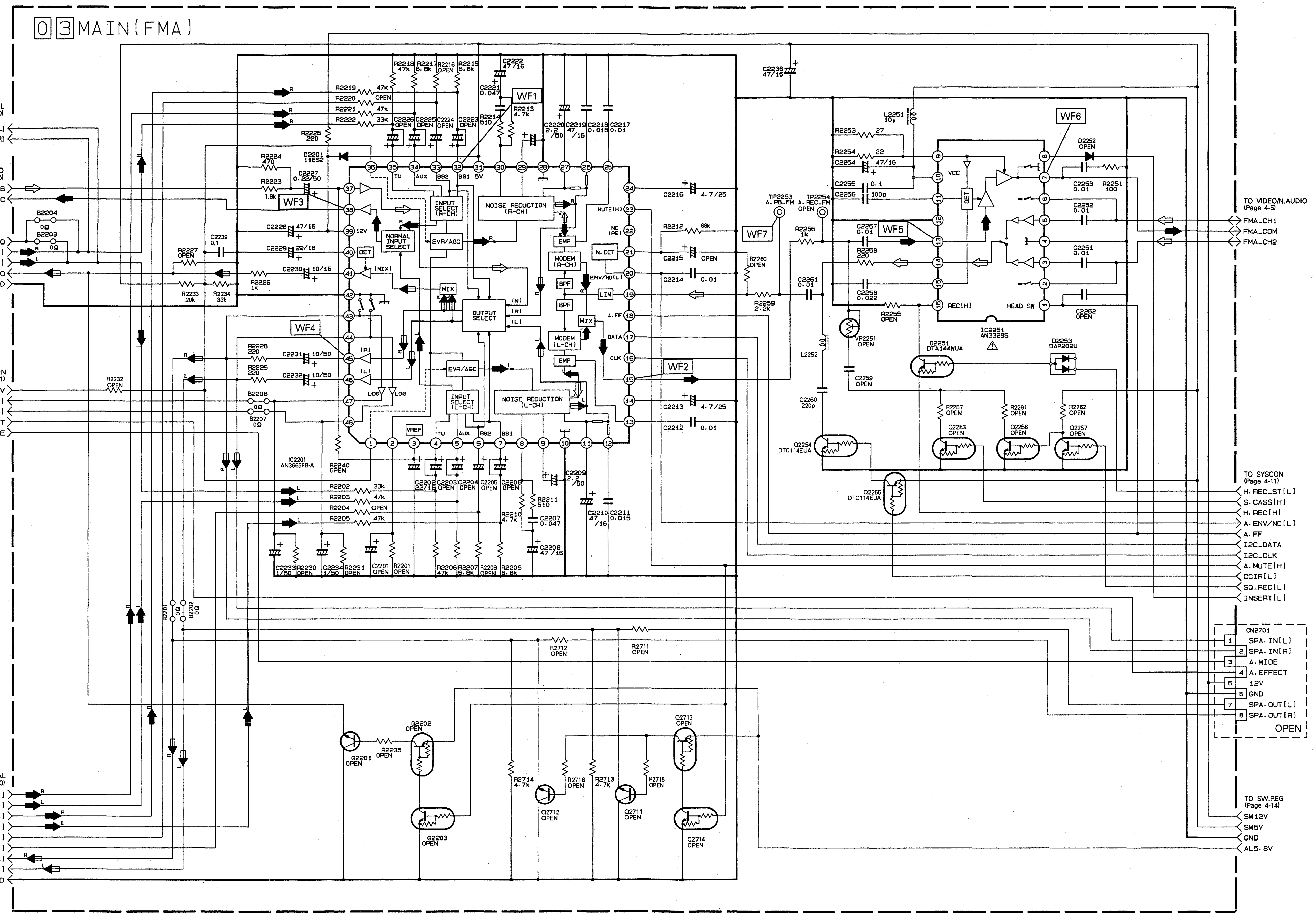
4.3 ON SCREEN SCHEMATIC DIAGRAM



03 MAIN (ON SCREEN)
TO TERMINAL (Page 4-20)
VIDEO_OSD_OUT
TO SW REG (Page 4-14)
GND
SW5V
TO VIDEO (Page 4-5, 4-6)
VIDEO_OUT
VIDEO_OSD_OUT
SUPER_IMPOSE
2FSC
SYNC_DET[H]
TO SYSCON (Page 4-11, 4-12)
P.MUTE[L]
SYNC_DET[H]
OSD_CS
OSD_CLK
OSD_DATA
Q203 2SD1819A/QRS
R226 1.8K
C281 OPEN
L204 1μ
C215 220/6.3
C209 0.22
10K R205
10K R206
10K R204
10K R201
B203 0Ω
D202 IN4148M
D201 IN4148M
L202 33μ
C201 10p
C202 OPEN
C208 OPEN
IC201 LC74789N-9718
C213 1/50
R211 10K
C212 OPEN
R209 OPEN
C210 OPEN
L252 22μ
R213 100
R208 2.2k
C211 1/50
C258 56p
WF1
WF2
C207 0.22
L203 22μ
C203 33p
C204 33p
B202 OPEN
B204 0Ω
C282 OPEN
C205 OPEN
C206 OPEN
24 Vdd1
23 RST
22 CDLR
21 SEPin
20 SEPout
19 SEPc
18 SYNCin
17 Vdd1
16 SEC_COL
15 Vin
14 Vss1
13 Vout
1 Vss1
2 X_tal_in
3 MUTE(L)
4 CHARA
5 NFTON
6 OSCin
7 OSCout
8 SYNCjdg
9 CS
10 SCLK
11 DATAin
12 Vdd2

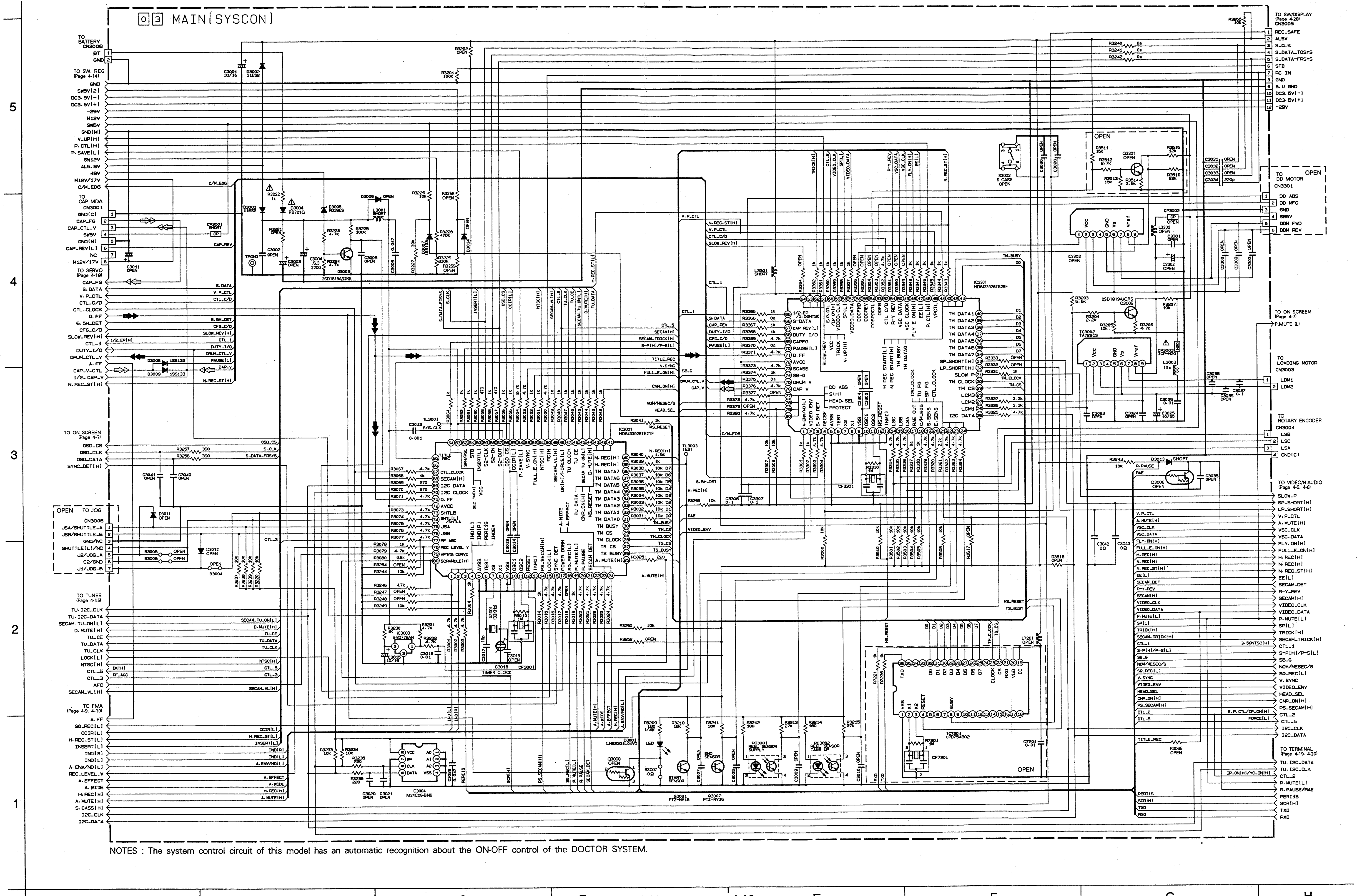
NOTE : For ON SCREEN waveforms, please refer to page4-24.

4.4 FMA SCHEMATIC DIAGRAM


03 MAIN(FMA)
TO TERMINAL (Page 4-20)
DEMOD[L]
DEMOD[R]
TO VIDEO/N.AUDIO (Page 4-5)
NA_PB
NA_REC
TO TUNER (Page 4-16)
TU_AUDIO
DEMOD[R]
DEMOD[L]
RF_AUDIO
GND
TOSYSCON (Page 4-11)
REC_LEVEL_V
IND[R]
IND[L]
A. EFFECT
A. WIDE
TO TERMINAL (Page 4-20)
F. AUDIO[R]
F. AUDIO[L]
A. IN1[R]
A. IN1[L]
A. IN2[R]
A. IN2[L]
LINE_OUT[R]
LINE_OUT[L]
GND
IC2201 AN3665FB-A
NOISE REDUCTION (R-CH)
NOISE REDUCTION (L-CH)
INPUT SELECT (R-CH)
INPUT SELECT (L-CH)
NORMAL INPUT SELECT
EVR/AGC
OUTPUT SELECT
MIX
EMP
MODEM (R-CH)
MODEM (L-CH)
BPF
LIM
N. DET
DET
VREF
WF1
WF2
WF3
WF4
WF5
WF6
WF7
TP2253 A.PB_FM
TP2254 A.REC_FM OPEN
IC2251 AN3328S
VCC
REC[H]
HEAD SW
Q2251 DTA144WUA
Q2254 DTC114EUA
Q2255 DTC114EUA
D2253 DAP202U
D2201 11ES2
D2252 OPEN
VR2251 OPEN
TO VIDEO/N.AUDIO (Page 4-5)
FMA_CH1
FMA_COM
FMA_CH2
TO SYSCON (Page 4-11)
H. REC_ST[L]
S. CASS[H]
H. REC[H]
A. ENV/ND[L]
A. FF
I2C_DATA
I2C_CLK
A. MUTE[H]
CCIR[L]
SQ_REC[L]
INSERT[L]
CN2701
1 SPA. IN[L]
2 SPA. IN[R]
3 A. WIDE
4 A. EFFECT
5 12V
6 GND
7 SPA. OUT[L]
8 SPA. OUT[R]
OPEN
TO SW.REG (Page 4-14)
SW12V
SW5V
GND
AL5. 8V
Q2201 OPEN
Q2202 OPEN
Q2203 OPEN
Q2711 OPEN
Q2712 OPEN
Q2713 OPEN
Q2714 OPEN

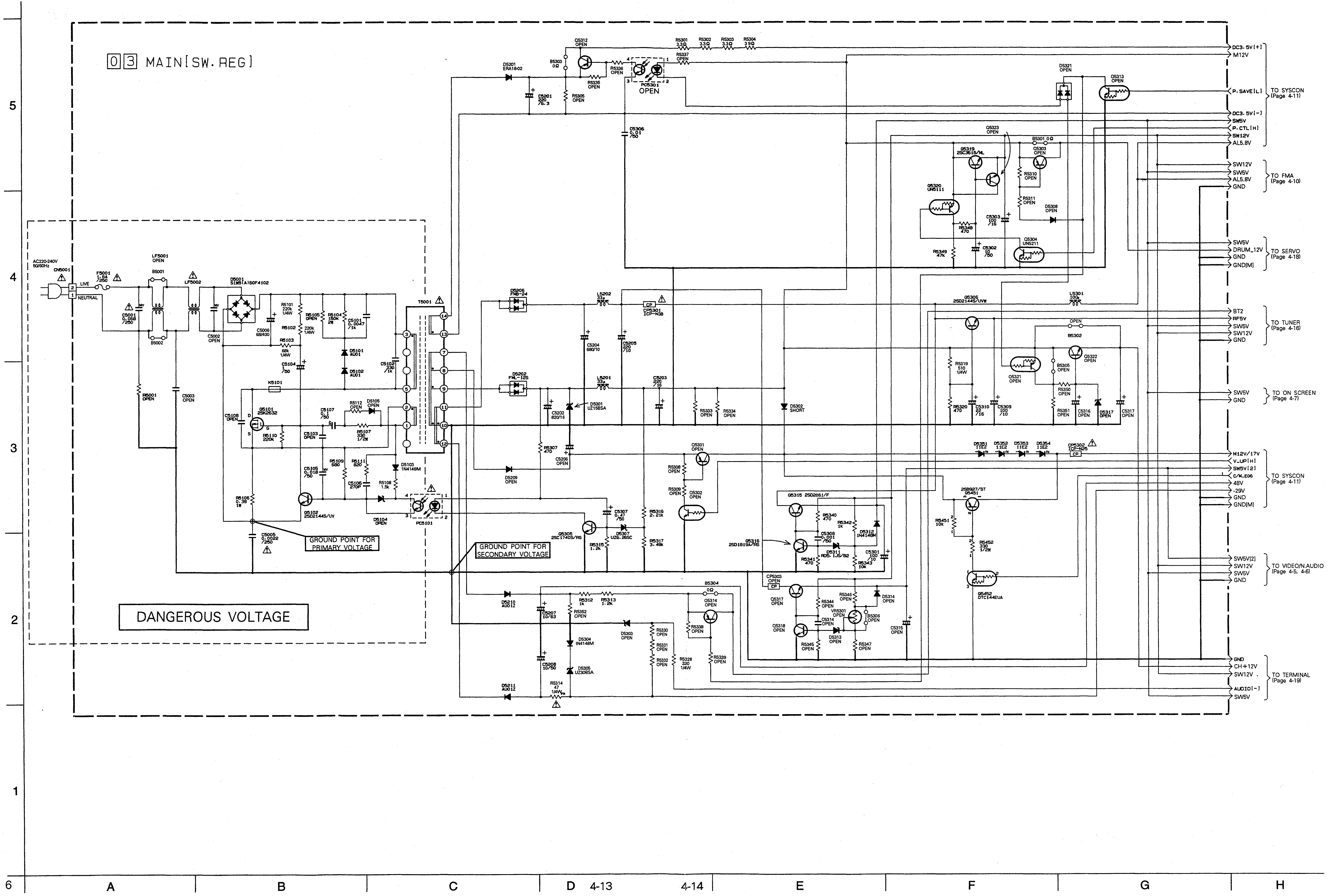
NOTE : For FMA waveforms, please refer to page 4-24.

4.5 SYSTEM CONTROL SCHEMATIC DIAGRAM


03 MAIN [SYSCON]
TO BATTERY CN3008
BT
GND
TO SW. REG (Page 4-14)
GND
SW5V(2)
DC3.5V(-)
DC3.5V(+)
-29V
M12V
SW5V
GND(M)
V_UP(H)
P.CTL(H)
P.SAVE(L)
SW12V
AL5.6V
48V
M12V/17V
C/M_E06
TO CAP MDA CN3001
GND(C)
CAP_FG
CAP_CTL_V
SW5V
GND(M)
CAP_REV(L)
NC
M12V/17V
TO SERVO (Page 4-18)
CAP_FG
S.DATA
V.P_CTL
CTL_C/D
CTL_CLOCK
D.FF
6.5H_DET
CFG_C/D
SLOW_REV(H)
CTL_1
DUTY_I/O
DRUM_CTL_V
A.FF
CAP_V_CTL
1/2_CAP_V
N.REC_ST(H)
TO ON SCREEN (Page 4-7)
OSD_CS
OSD_CLK
OSD_DATA
SYNC_DET(H)
OPEN TO JOG CN3006
JSA/SHUTTLE_A
JSB/SHUTTLE_B
GND/NC
SHUTTLE(L)/NC
J2/JOG_A
C2/GND
J1/JOG_B
TO TUNER (Page 4-15)
TU_I2C_CLK
TU_I2C_DATA
SECAM_TU_ON(L)
D.MUTE(H)
TU_CE
TU_DATA
TU_CLK
LOCK(L)
NTSC(H)
CTL_5
CTL_3
AFC
SECAM_VL(H)
TO FMA (Page 4-9, 4-10)
A.FF
SQ_REC(L)
CCIR(L)
H.REC_ST(L)
INSERT(L)
IND(R)
IND(L)
A.ENV/ND(L)
REC_LEVEL_V
A.EFFECT
A.WIDE
H.REC(H)
A.MUTE(H)
S.CASS(H)
I2C_CLK
I2C_DATA
IC3001 HD6433928TB21F
IC3301 HD6433926TB28F
IC3302
IC3002 TA7291S
IC3003 S-80728AN
IC3004 M24C08-BN6
IC7201 UPD754302
Q3003 2SD1819A/QRS
Q3005 2SD1819A/QRS
Q3001 PTZ-HY16
Q3002 PTZ-HY16
D3001 LNB2301L01VI
D3002 11ES2
D3003 11ES2
D3004 RB721Q
D3005 RD39ES
D3008 1SS133
D3009 1SS133
PC3001 REEL SENSOR SUPPLY
PC3002 REEL SENSOR TAKE UP
START SENSOR
END SENSOR
LED
X3001 32K(Hz)
CF3001
CF3301
CF7201
S3003 S CASS OPEN
TIMER CLOCK
TO SW/DISPLAY (Page 4-28) CN3005
REC_SAFE
AL5V
S_CLK
S_DATA_TOSYS
S_DATA_FRSYS
STB
RC IN
GND
B-U GND
DC3.5V(-)
DC3.5V(+)
-29V
TO DD MOTOR CN3301
OPEN
DD ABS
DD MFG
GND
SW5V
DDM FWD
DDM REV
TO ON SCREEN (Page 4-7)
P.MUTE (L)
TO LOADING MOTOR CN3003
LDM1
LDM2
TO ROTARY ENCODER CN3004
LSB
LSC
LSA
GND(C)
TO VIDEO/IN AUDIO (Page 4-5, 4-6)
SLOW_P
SP_SHORT(H)
LP_SHORT(H)
V.P_CTL
A.MUTE(H)
VSC_CLK
VSC_DATA
FLY.ON(H)
FULL_E_ON(H)
H.REC(H)
N.REC(H)
N.REC_ST(H)
EE(L)
SECAM_DET
R-Y_REV
SECAM(H)
VIDEO_CLK
VIDEO_DATA
P.MUTE(L)
SP(L)
TRICK(H)
SECAM_TRICK(H)
CTL_1
S-P(H)/P-S(L)
SB_G
NOM/MESEC/S
SQ_REC(L)
V.SYNC
VIDEO_ENV
HEAD_SEL
CNR_ON(H)
PS_SECAM(H)
CTL_2
CTL_5
I2C_CLK
I2C_DATA
TO TERMINAL (Page 4-19, 4-20)
TU_I2C_DATA
TU_I2C_CLK
CTL_2
P.MUTE(L)
R.PAUSE/RAE
PERI1S
SCR(H)
TXD
RXD
OPEN

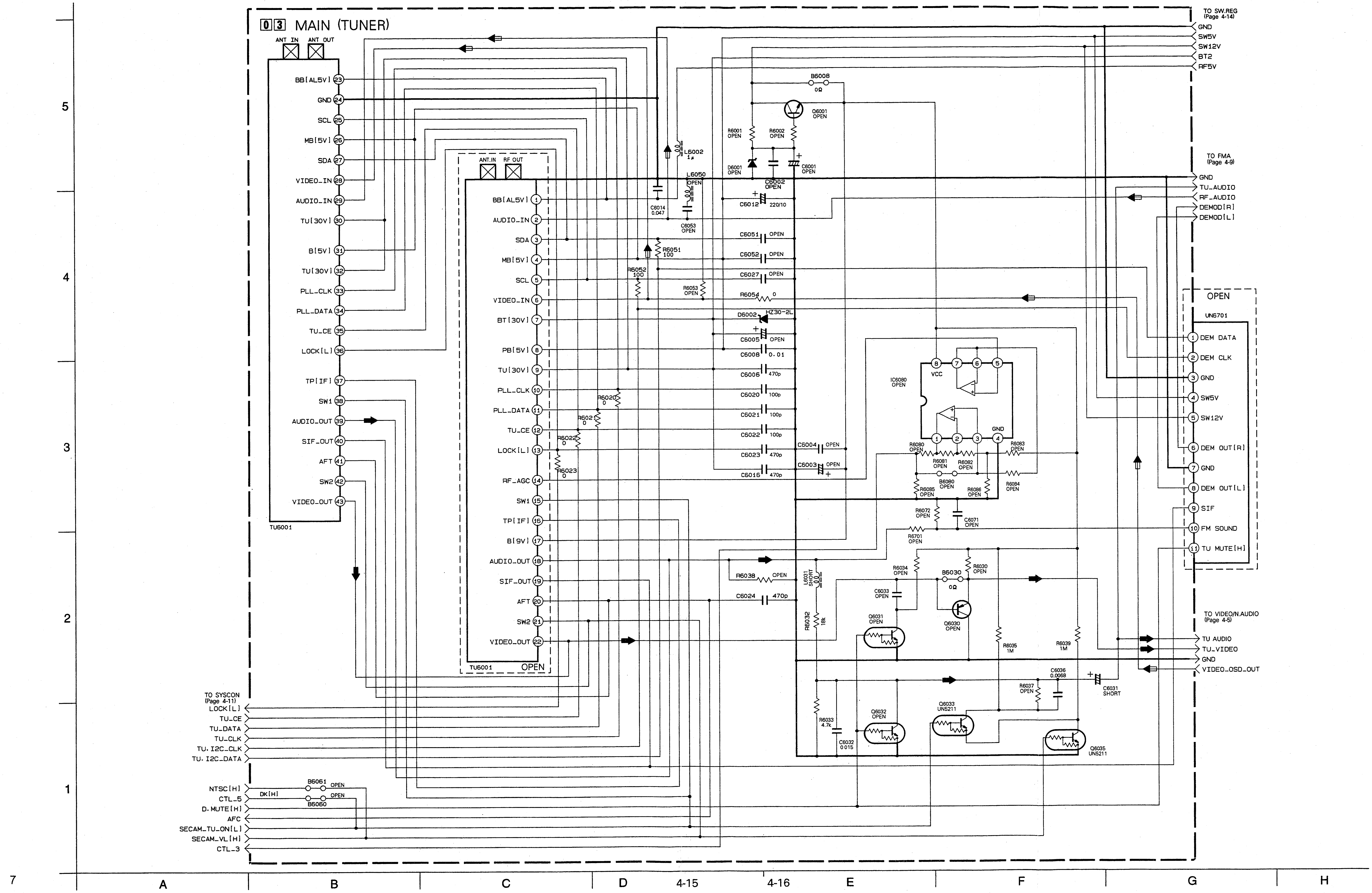
NOTES : The system control circuit of this model has an automatic recognition about the ON-OFF control of the DOCTOR SYSTEM.

4.6 SWITCHING REGULATOR SCHEMATIC DIAGRAM



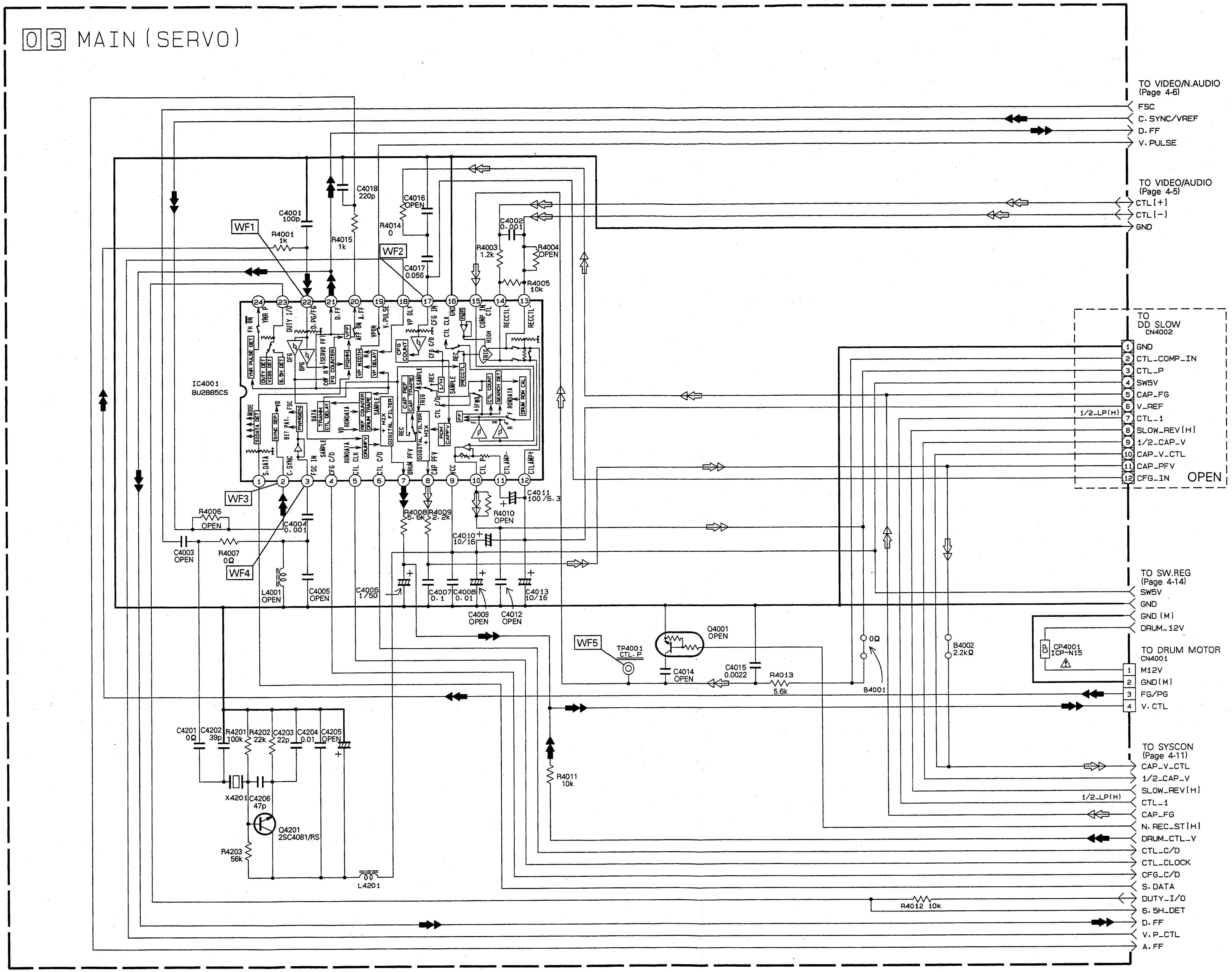
03 MAIN[SW.REG]
AC220-240V 50/60Hz
CN5001
LIVE
NEUTRAL
F5001 1.6A /250
LF5001 OPEN
B5001
B5002
LF5002
C5001 0.068 /250
C5002 OPEN
D5001 S1WB(A)60F4102
C5006 68/400
R5101 220k 1/4W
R5102 220k 1/4W
R5103 68k 1/4W
R5105 OPEN
R5104 150k 2W
C5101 0.0047 /1k
D5101 AU01
D5102 AU01
C5102 330p /1k
C5104 1 /50
K5101
R5001 OPEN
C5003 OPEN
C5108 OPEN
Q5101 2SK2632
D
G
S
R5110 220k
C5107 0.1 /50
C5103 OPEN
R5112 OPEN
D5105 OPEN
R5107 330 1/2W
C5105 0.018 /50
R5109 680
R5111 820
C5106 270P
D5103 1N4148M
R5108 1.5k
R5106 0.39 1W
Q5102 2SD2144S/UV
D5104 OPEN
PC5101
C5005 0.0022 /250
GROUND POINT FOR PRIMARY VOLTAGE
DANGEROUS VOLTAGE
T5001
GROUND POINT FOR SECONDARY VOLTAGE
D5201 ERA18-02
C5201 220 /6.3
B5303 0Ω
Q5312 OPEN
R5305 OPEN
R5335 OPEN
R5336 OPEN
PC5301 OPEN
R5337 OPEN
R5301 3.3Ω
R5302 3.3Ω
R5303 3.3Ω
R5304 3.9Ω
C5306 0.01 /50
D5206 FMB-24
L5202 33μ
CP
CP5301 ICP-N38
C5204 680/10
C5205 220 /10
D5202 FML-12S
L5201 33μ
C5203 220 /16
C5202 820/16
D5301 UZ15BSA
R5333 OPEN
R5334 OPEN
D5302 SHORT
R5307 470
C5206 OPEN
D5209 OPEN
Q5301 OPEN
R5308 OPEN
R5309 OPEN
Q5302 OPEN
C5307 0.47 /50
D5307 UZ6.2BSC
Q5305 2SC1740S/RS
R5315 1.2k
R5316 2.21k
R5317 3.48k
D5210 AU01Z
C5207 10/63
R5312 1k
R5313 1.2k
R5352 OPEN
B5304 0Ω
Q5314 OPEN
D5304 1N4148M
D5303 OPEN
R5330 OPEN
R5331 OPEN
R5332 OPEN
R5328 330 1/4W
R5338 OPEN
R5339 OPEN
C5208 10/50
D5305 UZ30BSA
D5211 AU01Z
R5314 47 1/4W
D5321 OPEN
Q5313 OPEN
Q5323 OPEN
Q5319 2SC3616/ML
B5301 0Ω
Q5303 OPEN
R5310 OPEN
Q5320 UN5111
R5311 OPEN
D5308 OPEN
C5303 100 /16
R5348 470
R5349 47k
C5302 10 /50
Q5304 UN5211
Q5306 2SD2144S/UVW
L5301 100μ
OPEN
B5302
R5319 510 1/4W
Q5321 OPEN
B5305 OPEN
Q5322 OPEN
R5350 OPEN
R5320 470
C5310 22 /16
C5309 100 /10
R5351 OPEN
C5316 OPEN
D5317 OPEN
C5317 OPEN
D5351 11E2
D5352 11E2
D5353 11E2
D5354 11E2
CP5302 ICP-N25
Q5315 2SD2061/F
R5340 470
R5342 1k
D5312 1N4148M
C5308 0.001 /50
Q5316 2SD1819A/RS
D5311 RD5.1JS/B2
R5341 470
C5301 100 /10
R5343 10k
CP5303 OPEN
Q5317 OPEN
R5344 OPEN
R5346 OPEN
D5314 OPEN
VR5301 OPEN
B5306 OPEN
C5314 OPEN
Q5318 OPEN
D5313 OPEN
R5345 OPEN
R5347 OPEN
C5315 OPEN
2SB927/ST Q5451
R5451 10k
R5452 330 1/2W
Q5452 DTC144EUA
DC3.5V[+]
M12V
P.SAVE[L]
DC3.5V[-]
SW5V
P.CTL[H]
SW12V
AL5.8V
TO SYSCON (Page 4-11)
SW12V
SW5V
AL5.8V
GND
TO FMA (Page 4-10)
SW5V
DRUM_12V
GND
GND[M]
TO SERVO (Page 4-18)
BT2
RF5V
SW5V
SW12V
GND
TO TUNER (Page 4-16)
SW5V
GND
TO ON SCREEN (Page 4-7)
M12V/17V
V_UP[H]
SW5V[2]
C/M_E06
48V
-29V
GND
GND[M]
TO SYSCON (Page 4-11)
SW5V[2]
SW12V
SW5V
GND
TO VIDEO/N.AUDIO (Page 4-5, 4-6)
GND
CH+12V
SW12V
AUDIO[-]
SW5V
TO TERMINAL (Page 4-19)
1
2
3
4
5
6
A
B
C
D
E
F
G
H

4.7 TUNER SCHEMATIC DIAGRAM



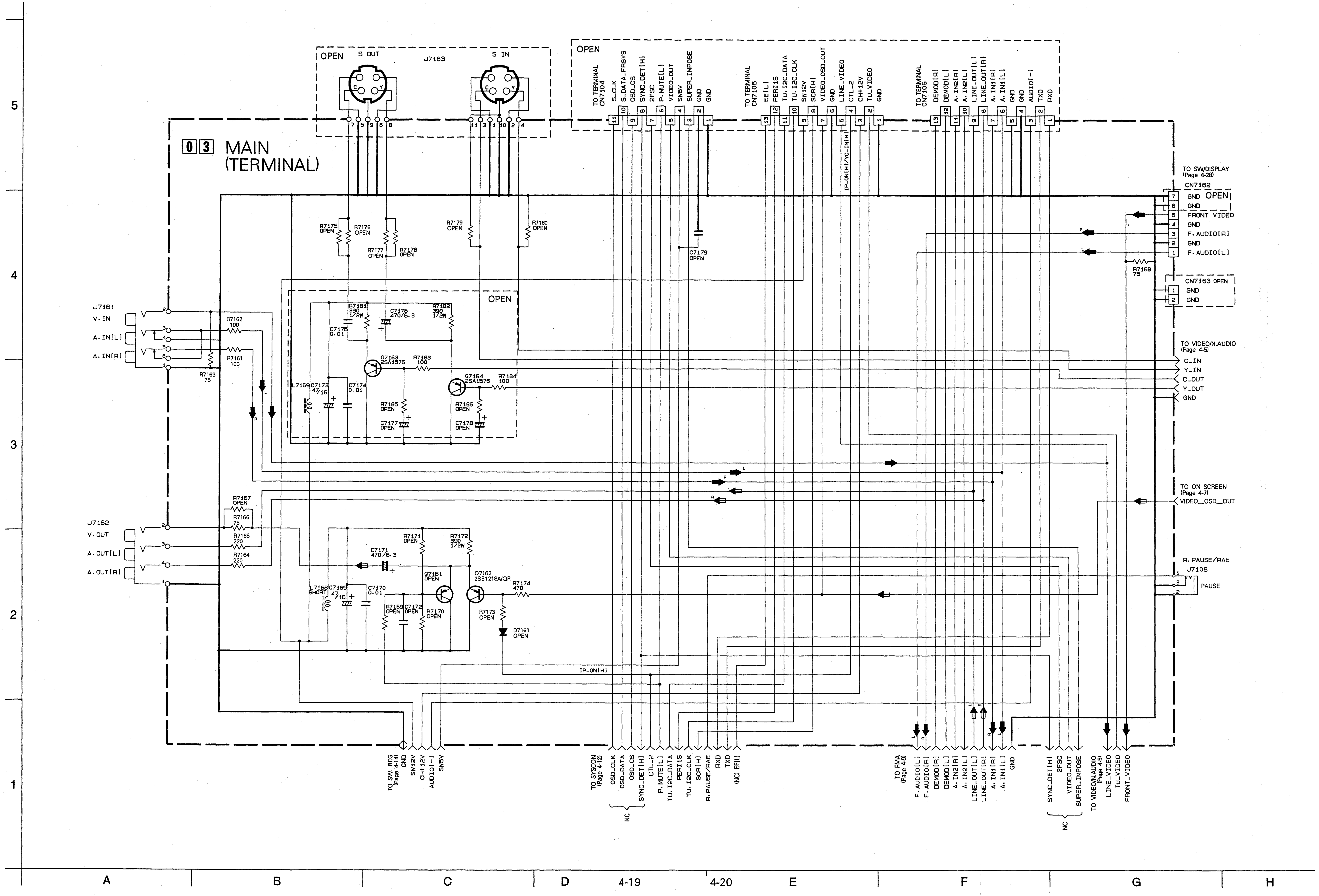
03 MAIN (TUNER)
ANT IN
ANT OUT
BB[AL5V] 23
GND 24
SCL 25
MB[5V] 26
SDA 27
VIDEO_IN 28
AUDIO_IN 29
TU[30V] 30
B[5V] 31
TU[30V] 32
PLL_CLK 33
PLL_DATA 34
TU_CE 35
LOCK[L] 36
TP[IF] 37
SW1 38
AUDIO_OUT 39
SIF_OUT 40
AFT 41
SW2 42
VIDEO_OUT 43
TU6001
ANT.IN
RF OUT
BB[AL5V] 1
AUDIO_IN 2
SDA 3
MB[5V] 4
SCL 5
VIDEO_IN 6
BT[30V] 7
PB[5V] 8
TU[30V] 9
PLL_CLK 10
PLL_DATA 11
TU_CE 12
LOCK[L] 13
RF_AGC 14
SW1 15
TP[IF] 16
B[9V] 17
AUDIO_OUT 18
SIF_OUT 19
AFT 20
SW2 21
VIDEO_OUT 22
TU6001
OPEN
L5002 1μ
L6050 OPEN
C6014 0.047
C6053 OPEN
R6051 100
R6052 100
R6053 OPEN
R6020 0
R6021 0
R6022 0
R6023 0
B6008 0Ω
Q6001 OPEN
R6001 OPEN
R6002 OPEN
D6001 OPEN
C6002 OPEN
C6001 OPEN
C6012 220/10
C6051 OPEN
C6052 OPEN
C6027 OPEN
R6054 0
D6002 HZ30-2L
C6005 OPEN
C6008 0.01
C6006 470p
C6020 100p
C6021 100p
C6022 100p
C6023 470p
C6016 470p
C6004 OPEN
C6003 OPEN
IC6080 OPEN
VCC
GND
R6080 OPEN
R6081 OPEN
R6082 OPEN
R6083 OPEN
B6080 OPEN
R6085 OPEN
R6086 OPEN
R6084 OPEN
R6072 OPEN
C6071 OPEN
R6701 OPEN
R6038 OPEN
C6024 470p
L6031 SHORT
R6032 18k
R6034 OPEN
B5030 0Ω
R6030 OPEN
C6033 OPEN
Q6031 OPEN
Q6030 OPEN
R6035 1M
R6039 1M
C6036 0.0068
C6031 SHORT
R6037 OPEN
R6033 4.7k
C6032 0.015
Q6032 OPEN
Q6033 UN5211
Q6035 UN5211
TO SW.REG (Page 4-14)
GND
SW5V
SW12V
BT2
RF5V
TO FMA (Page 4-9)
GND
TU_AUDIO
RF_AUDIO
DEMOD[R]
DEMOD[L]
OPEN
UN6701
1 DEM DATA
2 DEM CLK
3 GND
4 SW5V
5 SW12V
6 DEM OUT[R]
7 GND
8 DEM OUT[L]
9 SIF
10 FM SOUND
11 TU MUTE[H]
TO VIDEO/N.AUDIO (Page 4-5)
TU AUDIO
TU_VIDEO
GND
VIDEO_OSD_OUT
TO SYSCON (Page 4-11)
LOCK[L]
TU_CE
TU_DATA
TU_CLK
TU. I2C_CLK
TU. I2C_DATA
NTSC[H]
CTL_5
DK[H]
B6061 OPEN
B5060 OPEN
D. MUTE[H]
AFC
SECAM_TU_ON[L]
SECAM_VL[H]
CTL_3
5
4
3
2
1
7
A
B
C
D
E
F
G
H

4.8 SERVO SCHEMATIC DIAGRAM


0 3 MAIN (SERVO)
TO VIDEO/N.AUDIO (Page 4-6)
FSC
C.SYNC/VREF
D.FF
V.PULSE
TO VIDEO/AUDIO (Page 4-5)
CTL[+]
CTL[-]
GND
TO DD SLOW CN4002
1 GND
2 CTL_COMP_IN
3 CTL_P
4 SW5V
5 CAP_FG
6 V_REF
7 CTL_1
8 SLOW_REV[H]
9 1/2_CAP_V
10 CAP_V_CTL
11 CAP_PFV
12 CFG_IN
OPEN
1/2_LP(H)
TO SW.REG (Page 4-14)
SW5V
GND
GND(M)
DRUM_12V
CP CP4001 ICP-N15
TO DRUM MOTOR CN4001
1 M12V
2 GND(M)
3 FG/PG
4 V.CTL
TO SYSCON (Page 4-11)
CAP_V_CTL
1/2_CAP_V
SLOW_REV[H]
CTL_1
CAP_FG
N.REC_ST[H]
DRUM_CTL_V
CTL_C/D
CTL_CLOCK
CFG_C/D
S.DATA
DUTY_I/O
6.5H_DET
D.FF
V.P_CTL
A.FF
IC4001 BU2885CS
WF1
WF2
WF3
WF4
WF5
C4001 100p
R4001 1k
R4015 1k
C4018 220p
R4014 0
C4016 OPEN
C4017 0.056
C4002 0.001
R4003 1.2k
R4004 OPEN
R4005 10k
R4006 OPEN
R4007 0Ω
C4003 OPEN
C4004 0.001
C4005 OPEN
L4001 OPEN
C4006 1/50
C4007 0.1
C4008 0.01
C4009 OPEN
C4010 10/16
C4011 100/6.3
C4012 OPEN
C4013 10/16
R4008 5.6k
R4009 2.2k
R4010 OPEN
R4011 10k
R4012 10k
R4013 5.6k
C4014 OPEN
C4015 0.0022
Q4001 OPEN
TP4001 CTL.P
B4001 0Ω
B4002 2.2kΩ
C4201 0Ω
C4202 39p
R4201 100k
R4202 22k
C4203 22p
C4204 0.01
C4205 OPEN
X4201
C4206 47p
Q4201 2SC4081/RS
R4203 56k
L4201
S.DATA
C.SYNC
FSC IN
CFG C/D
CTL CLK
CTL C/D
DRUM PFV
CAP PFV
VCC
CTL P
CTLAMP-
CTLAMP+
RECCTL
RECCTL
COMP IN CTL
GND
CTL CLK
CFG IN
VP DLY
V.PULSE
AFF ON A.FF
D.FF
D.PG/FG
DUTY I/O
YHR P
FH ON

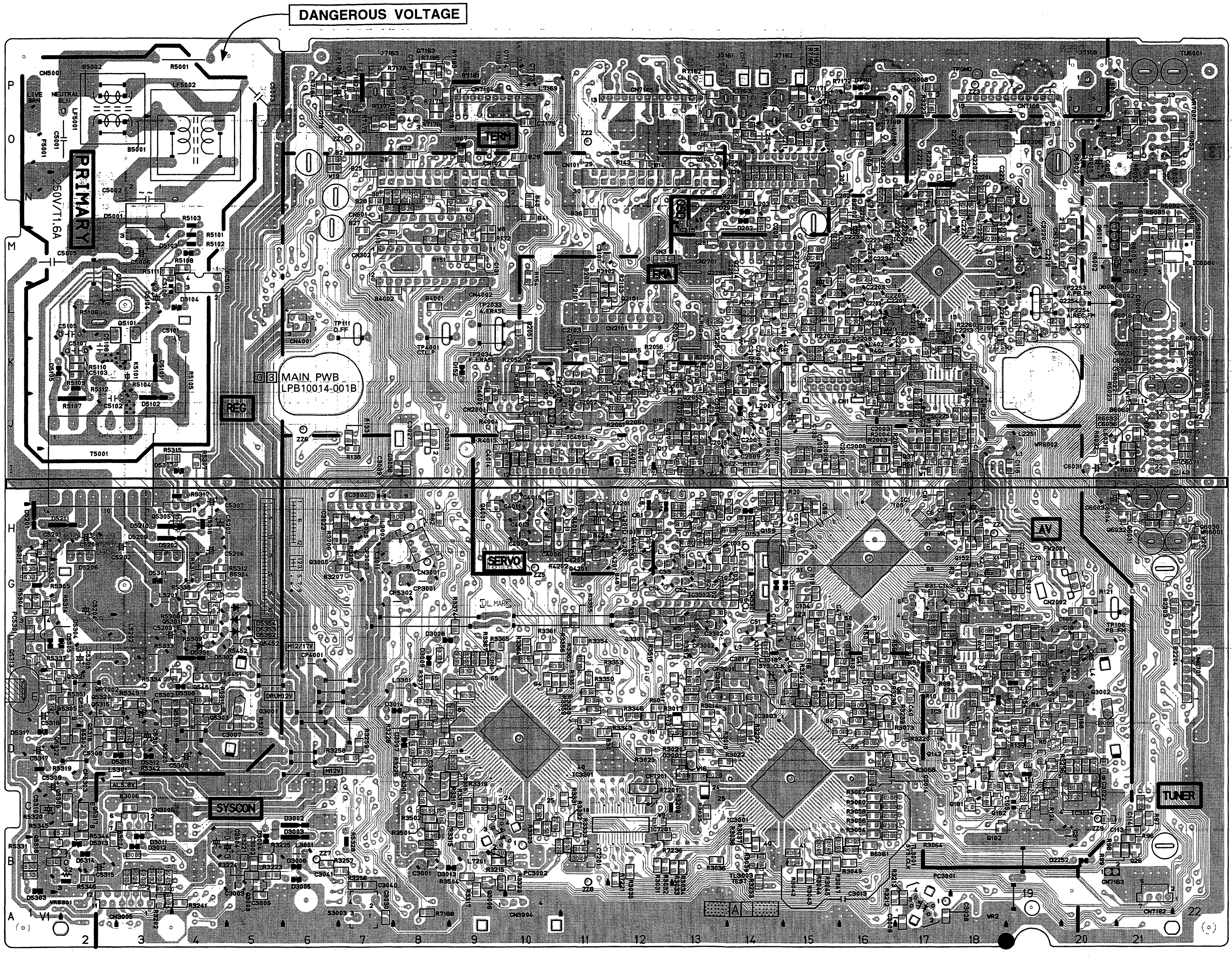
NOTE : For SERVO waveforms, please refer to page 4-24.

4.9 TERMINAL SCHEMATIC DIAGRAM

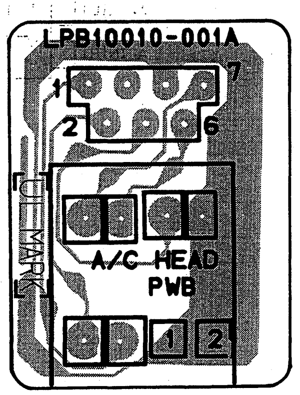


03 MAIN (TERMINAL)
OPEN
S OUT
S IN
J7163
OPEN
TO TERMINAL CN7104
S_CLK
S_DATA_FRSYS
OSD_CS
SYNC_DET[H]
2FSC
P.MUTE[L]
VIDEO_OUT
SW5V
SUPER_IMPOSE
GND
GND
TO TERMINAL CN7105
EE[L]
PERI1S
TU.I2C_DATA
TU.I2C_CLK
SW12V
SCR[H]
VIDEO_OSD_OUT
GND
LINE_VIDEO
CTL_2
CH+12V
TU_VIDEO
GND
TO TERMINAL CN7106
DEMOD[R]
DEMOD[L]
A.IN2[R]
A.IN2[L]
LINE_OUT[L]
LINE_OUT[R]
A.IN1[R]
A.IN1[L]
GND
GND
AUDIO[-]
TXD
RXD
IP_ON[H]/YC_IN[H]
TO SW/DISPLAY (Page 4-28)
CN7162
GND OPEN
GND
FRONT VIDEO
GND
F.AUDIO[R]
GND
F.AUDIO[L]
R7168 75
CN7163 OPEN
GND
GND
TO VIDEO/N.AUDIO (Page 4-5)
C_IN
Y_IN
C_OUT
Y_OUT
GND
TO ON SCREEN (Page 4-7)
VIDEO_OSD_OUT
R.PAUSE/RAE
J7108
PAUSE
R7175 OPEN
R7176 OPEN
R7177 OPEN
R7178 OPEN
R7179 OPEN
R7180 OPEN
C7179 OPEN
J7161
V.IN
A.IN[L]
A.IN[R]
R7162 100
R7161 100
R7163 75
R7181 390 1/2W
C7176 470/6.3
R7182 390 1/2W
C7175 0.01
Q7163 2SA1576
R7183 100
Q7164 2SA1576
R7184 100
L7169
C7173 47/16
C7174 0.01
R7185 OPEN
R7186 OPEN
C7177 OPEN
C7178 OPEN
J7162
V.OUT
A.OUT[L]
A.OUT[R]
R7167 OPEN
R7166 75
R7165 220
R7164 220
R7171 OPEN
R7172 390 1/2W
C7171 470/6.3
Q7161 OPEN
Q7162 2SB1218A/QR
R7174 470
L7168 SHORT
C7169 47/16
C7170 0.01
R7169 OPEN
C7172 OPEN
R7170 OPEN
R7173 OPEN
D7161 OPEN
IP_ON[H]
TO SW.REG (Page 4-14)
GND
SW12V
CH+12V
AUDIO[-]
SW5V
TO SYSCON (Page 4-12)
OSD_CLK
OSD_DATA
OSD_CS
SYNC_DET[H]
CTL_2
P.MUTE[L]
TU.I2C_DATA
PERI1S
TU.I2C_CLK
SCR[H]
R.PAUSE/RAE
RXD
TXD
(NC) EE[L]
NC
TO FMA (Page 4-9)
F.AUDIO[L]
F.AUDIO[R]
DEMOD[R]
DEMOD[L]
A.IN2[R]
A.IN2[L]
LINE_OUT[L]
LINE_OUT[R]
A.IN1[R]
A.IN1[L]
GND
SYNC_DET[H]
2FSC
VIDEO_OUT
SUPER_IMPOSE
NC
TO VIDEO/N.AUDIO (Page 4-5)
LINE_VIDEO
TU_VIDEO
FRONT_VIDEO
L
R
5
4
3
2
1
A
B
C
D
E
F
G
H

4.10 MAIN AND A/C HEAD CIRCUIT BOARDS


DANGEROUS VOLTAGE
PRIMARY
250V/T1.6A
REG
TERM
SERVO
SYSCON
AV
TUNER
MAIN PWB
LPB10014-001B
UL MARK
H12V
DRUM12V
M12/11V
ALS-8V

— A/C HEAD —


LPB10010-001A
A/C HEAD
PWB
UL MARK
1
2
6
7

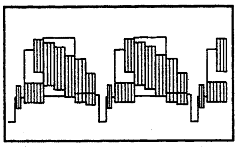
COMPONENT PARTS LOCATION GUIDE <MAIN>

REF.NO.	LOCATION		
CAPACITOR			
C1	A	D	15J
C3	B	C	17J
C5	B	C	17J
C6	B	C	17H
C7	A	D	18H
C9	B	C	18J
C11	B	C	18J
C12	B	C	17H
C13	A	D	18H
C14	B	C	18H
C15	B	C	18H
C16	B	C	19G
C17	B	C	19F
C18	B	C	20F
C19	B	C	19F
C20	B	C	19G
C21	B	C	19H
C23	B	C	18G
C24	B	C	18G
C25	B	C	18G
C27	B	C	19D
C29	B	C	18G
C30	B	C	18F
C31	B	C	17F
C32	B	C	16E
C34	B	C	16E
C35	B	C	16F
C36	B	C	17F
C37	A	D	20C
C38	B	C	18D
C39	B	C	18C
C40	B	C	17E
C41	B	C	16F
C42	B	C	16F
C43	B	C	15F
C44	B	C	16F
C45	B	C	15E
C46	B	C	16E
C47	B	C	15F
C48	A	D	15F
C49	B	C	15F
C51	A	D	14F
C52	A	D	13G
C53	A	D	12G
C54	A	D	12G
C55	A	D	13G
C56	A	D	12G
C57	B	C	15H
C58	B	C	15H
C59	B	C	15H
C60	B	C	14I
C61	B	C	12H
C62	B	C	14I
C63	B	C	13J
C64	A	D	13I
C65	B	C	13I
C73	B	C	16E
C74	B	C	19C
C76	B	C	19F
C77	B	C	19E
C78	B	C	19F
C79	B	C	19E
C80	B	C	19E
C81	B	C	17I
C82	B	C	17I
C83	B	C	17J
C84	B	C	17J
C85	B	C	20F
C86	A	D	20F
C87	B	C	18F
C88	B	C	18F
C89	B	C	18F
C90	B	C	18H
C91	B	C	14I
C92	B	C	12H
C93	B	C	13J
C96	B	C	17F
C97	B	C	17F
C98	B	C	13I
C99	B	C	13H
C101	B	C	12H
C102	B	C	13G
C103	B	C	14G
C104	B	C	14F
C105	A	D	19C
C107	B	C	17F
C108	B	C	17F
C113	B	C	21C
C114	B	C	21C
C115	B	C	18D
C118	B	C	19I
C123	B	C	16F
C127	B	C	20D
C128	B	C	9O
C129	B	C	8N
C130	B	C	8N
C131	B	C	9M
C133	B	C	15J
C134	B	C	15G
C141	B	C	20E
C143	A	D	17G
C146	B	C	18E
C147	B	C	17D
C148	B	C	18D
C153	B	C	19D
C154	B	C	13H
C158	B	C	19D
C164	B	C	18I
C165	B	C	20G
C167	B	C	14H
C181	B	C	18C
C191	B	C	18E
C201	B	C	15N
C202	B	C	15N
C203	B	C	15N
C204	B	C	14N
C205	B	C	14N
C206	B	C	14N
C207	B	C	14N
C208	B	C	15N
C209	B	C	15O
C210	B	C	15O
C211	A	D	14O
C212	B	C	15O
C213	A	D	15O
C215	A	D	13N
C258	B	C	14O
C281	B	C	13M
C282	B	C	14N
C401	A	D	15K
C402	B	C	15K
C403	B	C	16K
C404	B	C	16K
C405	B	C	16K
C406	B	C	16K
C407	B	C	16J
C408	B	C	16K
C409	B	C	16K
C2001	B	C	14J
C2002	A	D	14J
C2003	B	C	16I
C2004	A	D	14K
C2005	B	C	14K
C2006	B	C	16I
C2007	A	D	14J
C2008	B	C	16I
C2009	A	D	14J
C2010	A	D	14I
C2011	B	C	16I
C2013	B	C	15I
C2015	A	D	13J
C2016	A	D	13J
C2018	B	C	15I
C2020	B	C	15I
C2021	B	C	13J
C2051	B	C	10J
C2052	A	D	10K
C2053	B	C	11K
C2054	B	C	11K
C2055	A	D	12K
C2061	A	D	11J
C2062	B	C	11J
C2063	B	C	11K
C2064	A	D	12K
C2101	A	D	11M
C2102	A	D	14K
C2103	B	C	11L
C2201	A	D	16M
C2202	A	D	15L
C2203	A	D	16L
C2204	A	D	16L
C2205	A	D	16L
C2206	A	D	16L
C2207	B	C	16L
C2208	A	D	16K
C2209	A	D	17L
C2210	A	D	17L
C2211	B	C	17L
C2212	B	C	17L
C2213	A	D	18K
C2214	B	C	18L
C2215	A	D	18L
C2216	A	D	19L
C2217	B	C	19M
C2218	B	C	18M
C2219	A	D	19M
C2220	A	D	19M
C2221	B	C	18M
C2222	A	D	19M
C2223	A	D	18N
C2224	A	D	18N
C2225	A	D	18M
C2226	A	D	18N
C2227	A	D	17N
C2228	A	D	17N
C2229	A	D	16N
C2230	A	D	16N
C2231	A	D	17M
C2232	A	D	16M
C2233	A	D	16M
C2234	A	D	16M
C2236	A	D	19N
C2239	B	C	15L
C2251	B	C	17J
C2252	B	C	18J
C2253	B	C	18J
C2254	A	D	18K
C2255	B	C	18K
C2256	B	C	17K
C2257	B	C	17K
C2258	B	C	17K
C2259	B	C	14L
C2260	B	C	19L
C2261	B	C	19L
C2262	B	C	17J
C3001	A	D	8B
C3002	B	C	5B
C3003	A	D	5B
C3004	A	D	5B
C3005	B	C	5A
C3006	B	C	16D
C3007	B	C	4D
C3008	B	C	20E
C3009	B	C	17A
C3010	B	C	9B
C3011	A	D	7G
C3012	B	C	16D
C3013	A	D	16C
C3014	A	D	16C
C3015	A	D	13E
C3016	B	C	14D
C3017	B	C	14F
C3018	A	D	14E
C3019	B	C	14E
C3020	B	C	20C
C3021	B	C	20C
C3022	B	C	20C
C3023	B	C	6H
C3024	B	C	8H
C3025	A	D	7H
C3026	B	C	7H
C3027	B	C	8J
C3028	B	C	17A
C3030	B	C	7A
C3031	B	C	3B
C3032	B	C	3B
C3033	B	C	3B
C3034	B	C	3B
C3035	B	C	9B
C3038	B	C	8I
C3039	B	C	8I
C3040	B	C	7B
C3041	B	C	7B
C3042	B	C	11B
C3043	B	C	11B
C3301	B	C	13F
C3302	A	D	13F
C3303	B	C	14G
C3304	A	D	10E
C3305	A	D	9E
C3306	B	C	9D
C3307	B	C	10F
C3308	B	C	12G
C3309	B	C	13G
C4001	B	C	11I
C4002	B	C	9J
C4003	B	C	12I
C4004	B	C	11I
C4005	B	C	11I
C4006	A	D	10H
C4007	B	C	10H
C4008	B	C	10I
C4009	A	D	10H
C4010	A	D	10H
C4011	A	D	10I
C4012	B	C	10I
C4013	A	D	10H
C4014	B	C	9I
C4015	B	C	10I
C4016	B	C	10J
C4017	B	C	10J
C4018	B	C	10I
C4201	B	C	12H
C4202	B	C	11H
C4203	B	C	11H
C4204	B	C	11H
C4205	A	D	11H
C4206	B	C	11H
C5001	A	D	2O
C5002	A	D	3N
C5003	A	D	5P
C5005	A	D	2M
C5006	A	D	3M
C5101	A	D	3K
C5102	A	D	2J
C5103	B	C	2K
C5104	A	D	3L
C5105	A	D	2L
C5106	A	D	3L
C5107	A	D	2K
C5108	A	D	2K
C5201	A	D	1H
C5202	A	D	3H
C5203	A	D	4F
C5204	A	D	2F
C5205	A	D	2F
C5206	A	D	4H
C5207	A	D	4H
C5208	A	D	2H
C5301	A	D	3D
C5302	A	D	3E
C5303	A	D	4D
C5306	B	C	1F
C5307	A	D	4I
C5308	B	C	2D
C5309	A	D	2C
C5310	A	D	1C
C5314	B	C	2C
C5315	A	D	2B
C5316	A	D	1E
C5317	A	D	1D
C6001	A	D	21M
C6002	B	C	21L
C6003	A	D	21I
C6004	B	C	20I
C6005	A	D	20O
C6006	B	C	21N
C6008	B	C	21L
C6012	A	D	20O
C6014	B	C	21P
C6016	B	C	21L
C6020	B	C	21K
C6021	B	C	21K
C6022	B	C	21K
C6023	B	C	21K
C6024	B	C	22I
C6027	B	C	22O
C6031	A	D	20I
C6032	B	C	21J
C6033	B	C	21H
C6036	B	C	21I
C6051	B	C	21O
C6052	B	C	21O
C6053	B	C	21O
C6071	B	C	22I
C7169	A	D	16P
C7170	B	C	16O
C7171	A	D	15P
C7172	B	C	16O
C7173	A	D	10P
C7174	B	C	10P
C7175	B	C	8P
C7176	A	D	6P
C7177	B	C	8P
C7178	B	C	6P
C7179	B	C	10O
C7201	B	C	11B
CONNECTOR			
CN1	A	D	15K
CN3	A	D	12M
CN101	A	D	13N
CN102	A	D	10N
CN302	A	D	7M
CN303	A	D	20N
CN501	A	D	7N
CN2001	A	D	10J
CN2002	A	D	20G
CN2101	A	D	11L
CN2701	A	D	13M
CN3001	A	D	8H
CN3003	A	D	8J
CN3004	A	D	10A
CN3005	A	D	3A
CN3006	A	D	3C
CN3008	A	D	17P
CN3301	A	D	14H
CN4001	A	D	6L
CN4002	A	D	9M
CN5001	A	D	1P
CN7104	A	D	10P
CN7105	A	D	13P
CN7106	A	D	19P
CN7162	A	D	21A
CN7163	A	D	20B
CIRCUIT PROTECTOR			
CP3001	A	D	8G
CP3002	A	D	13F
CP3003	A	D	7H
CP4001	A	D	6F
CP5301	A	D	2E
CP5302	A	D	7G
CP5303	A	D	2C
DIODE			
D6	A	D	14G
D11	A	D	15G
D152	A	D	9K
D153	A	D	14H
D201	A	D	14N
D202	A	D	14N
D2001	A	D	14J
D2201	A	D	18N
D2252	A	D	20B
D2253	B	C	18L
D3001	A	D	13D
D3002	A	D	5C
D3003	A	D	5B
D3004	A	D	5C
D3005	A	D	6B
D3006	A	D	6B
D3007	A	D	8D
D3008	A	D	8F
D3009	A	D	8F
D3011	A	D	3C
D3012	A	D	3B
D3013	A	D	8B
D3014	A	D	8E
D5001	B	C	3N
D5101	A	D	3K
D5102	A	D	3J
D5103	A	D	4M
D5104	A	D	3L
D5105	A	D	1K
D5201	A	D	1I
D5202	A	D	4H
D5206	A	D	2H
D5209	A	D	3H
D5210	A	D	3H
D5211	A	D	1H
D5301	A	D	3G
D5302	A	D	4F
D5303	A	D	1B
D5304	A	D	1F
D5305	A	D	2F
D5307	A	D	3I
D5308	A	D	4E
D5311	A	D	2D
D5312	A	D	3D
D5313	A	D	2B
D5314	A	D	2B
D5317	A	D	1D
D5321	B	C	1E
D5351	A	D	4F
D5352	A	D	4F
D5353	A	D	5F
D5354	A	D	4G
D6001	A	D	20M
D6002	A	D	20O
D7161	A	D	16P
IC			
IC1	B	C	16H
IC2	B	C	18F
IC3	B	C	18D
IC201	A	D	15N
IC2201	B	C	17M
IC2251	B	C	17K
IC3001	B	C	15D
IC3002	A	D	6H
IC3003	B	C	14E
IC3004	A	D	20C
IC3301	B	C	10D
IC3302	A	D	12G
IC4001	A	D	11I
IC6080	B	C	22M
IC7201	B	C	12C
JACK			
J7108	A	D	20P
J7161	A	D	13P
J7162	A	D	14P
J7163	A	D	8P
COIL			
L1	A	D	19I
L2	A	D	20F
L3	A	D	19F
L4	A	D	20F
L5	A	D	18D
L6	A	D	18D
L7	A	D	14F
L8	A	D	12H
L9	A	D	13I
L12	A	D	18E
L13	A	D	18E
L14	A	D	12I
L16	A	D	20F
L18	A	D	17G
L23	B	C	15F
L102	A	D	13G
L103	A	D	14G
L104	A	D	14F
L107	A	D	9O
L151	A	D	19D
L202	A	D	16O
L203	A	D	15N
L204	A	D	13N
L252	A	D	14O
L401	A	D	14K
L402	A	D	16K
L2001	A	D	14J
L2251	A	D	18J
L2252	A	D	19L
L3001	A	D	6B
L3003	A	D	7H
L3301	A	D	8E
L3302	A	D	13F
L4001	A	D	11I
L4201	A	D	11H
L5201	A	D	3G
L5202	A	D	2F
L5301	A	D	3D
L6002	A	D	21P
L6031	A	D	20J
L6050	A	D	21O
L7168	A	D	16O
L7169	A	D	10P
L7201	A	D	9B
TRANSISTOR			
Q1	B	C	19E
Q2	B	C	18G
Q6	B	C	17E
Q13	B	C	19F
Q14	B	C	19E
Q15	B	C	19E
Q16	B	C	18E
Q17	B	C	12I
Q18	B	C	12I
Q19	B	C	12J
Q21	B	C	13H
Q26	B	C	21B
Q34	B	C	18J
Q35	B	C	17I
Q36	B	C	17I
Q37	B	C	17I
Q38	B	C	19D
Q39	B	C	19C
Q44	B	C	12H
Q45	B	C	19E
Q46	B	C	18D
Q47	B	C	18G
Q48	B	C	18G
Q101	B	C	13I
Q102	B	C	18C
Q103	B	C	8N
Q104	B	C	9M
Q141	B	C	18D
Q142	B	C	17D
Q152	B	C	18H
Q153	B	C	19D
Q154	B	C	20D
Q157	B	C	13H
Q158	B	C	13H
Q159	B	C	14H
Q160	B	C	9M
Q161	B	C	19C
Q181	B	C	18C
Q182	B	C	18C
Q203	B	C	13O
Q401	B	C	14L
Q402	B	C	14L
Q403	B	C	15K
Q404	B	C	16K
Q405	B	C	16J
Q2001	B	C	13K
Q2002	B	C	13K
Q2003	B	C	13K
Q2051	B	C	11K
Q2052	B	C	12K
Q2053	B	C	13K
Q2054	B	C	12K
Q2055	B	C	13K
Q2061	B	C	12J
Q2062	B	C	12K
Q2063	B	C	12K
Q2101	B	C	11L
Q2102	B	C	14K
Q2201	B	C	17O
Q2202	B	C	18O
Q2203	B	C	18O
Q2251	B	C	18K
Q2253	B	C	14L
Q2254	B	C	19L
Q2255	B	C	19L
Q2256	B	C	14L
Q2257	B	C	14L
Q2711	B	C	14M
Q2712	B	C	15L
Q2713	B	C	14M
Q2714	B	C	14L
Q3001	A	D	5E
Q3002	A	D	20E
Q3003	B	C	5B
Q3005	B	C	7H
Q3006	B	C	9B
Q3008	B	C	13D
Q3301	B	C	12F
Q4001	B	C	9H
Q4201	B	C	11H
Q5101	A	D	2L
Q5102	A	D	2L
Q5301	A	D	4F
Q5302	B	C	4G
Q5303	A	D	4E
Q5304	B	C	4E
Q5305	A	D	3H
Q5306	A	D	2C
Q5312	B	C	1H
Q5313	B	C	1F
Q5314	B	C	4G
Q5315	A	D	2E
Q5316	B	C	2D
Q5317	A	D	2C
Q5318	B	C	1B
Q5319	A	D	4E
Q5320	B	C	2E
Q5321	B	C	1E
Q5322	A	D	2D
Q5323	A	D	3E
Q5451	A	D	4E
Q5452	B	C	5F
Q6001	A	D	20N
Q6030	B	C	22H
Q6031	B	C	21H
Q6032	B	C	21H
Q6033	B	C	21J
Q6035	B	C	22J
Q7161	B	C	16P
Q7162	B	C	15O
Q7163	B	C	8P
Q7164	B	C	7P
RESISTOR			
R1	B	C	19F
R2	B	C	18H
R3	B	C	18G
R4	B	C	19E
R5	B	C	19D
R6	B	C	20E
R7	B	C	17F
R8	B	C	17F
R9	B	C	17F
R10	B	C	17E
R11	B	C	18D
R13	B	C	16E
R14	B	C	16F
R15	B	C	15F
R16	B	C	15F
R17	B	C	15G
R18	B	C	15F
R19	B	C	15G
R20	B	C	15H
R21	B	C	13H
R22	B	C	14H
R23	B	C	13I
R24	B	C	14I
R25	B	C	13J
R46	B	C	19F
R47	B	C	19F
R48	B	C	19F
R49	B	C	19F
R50	B	C	19E
R52	B	C	17I
R54	B	C	19E
R55	B	C	19E
R56	B	C	16F
R57	B	C	18H
R59	B	C	17F
R60	B	C	12E
R61	B	C	12E
R62	B	C	8H
R63	B	C	13H
R64	B	C	13I
R65	B	C	13J
R67	B	C	15H
R68	B	C	17F
R69	B	C	17E
R71	B	C	13I
R72	B	C	8O
R73	B	C	12E
R74	B	C	12I
R75	B	C	13H
R76	B	C	16E
R77	B	C	13J
R94	B	C	18F
R95	B	C	21C
R96	B	C	21B
R97	B	C	21C
R98	B	C	21B
R99	B	C	21B
R101	B	C	12I
R116	B	C	19G
R117	B	C	13H
R120	B	C	18I
R121	B	C	20G
R122	B	C	19C
R123	B	C	19C
R124	B	C	19C
R126	B	C	8N
R127	B	C	8N
R128	B	C	7N
R129	B	C	8M
R130	B	C	8M
R133	B	C	7J
R137	B	C	19G
R138	B	C	7I
R139	B	C	19D
R140	B	C	19D
R141	B	C	18E
R143	B	C	12O
R150	B	C	16F
R151	B	C	9M
R154	B	C	10M
R156	B	C	19D
R157	B	C	19D
R158	B	C	20E
R159	B	C	19C
R161	B	C	13H
R162	B	C	13H
R163	B	C	13H
R164	B	C	14H
R165	B	C	14H
R166	B	C	14H
R168	B	C	18G
R169	B	C	19G
R172	B	C	9M
R177	B	C	14I
R178	B	C	18G
R179	B	C	18F
R201	B	C	15N
R204	B	C	14N
R205	B	C	14N
R206	B	C	14N
R208	B	C	14O
R209	B	C	15O
R211	B	C	15O
R213	B	C	14O
R226	B	C	14O
R401	B	C	14L
R402	B	C	15L
R403	B	C	15K
R404	B	C	16K
R405	B	C	17K
R408	B	C	16K
R409	B	C	16J
R410	B	C	16J
R2001	B	C	17I
R2002	B	C	13L
R2003	B	C	16I
R2004	B	C	16I
R2005	B	C	14K
R2006	B	C	13K
R2007	B	C	13J
R2008	B	C	13J
R2009	B	C	15I
R2010	B	C	15I
R2013	B	C	15L
R2014	B	C	15I
R2015	B	C	13J
R2016	B	C	13J
R2018	B	C	13K
R2019	B	C	13K
R2051	B	C	10K
R2052	B	C	10K
R2053	B	C	10K
R2054	B	C	11K
R2055	B	C	11K
R2056	A	D	12K
R2057	B	C	12K
R2058	B	C	13K
R2059	B	C	12K
R2060	B	C	13K
R2061	B	C	11J
R2062	B	C	12J
R2063	B	C	12J
R2101	B	C	11L
R2102	B	C	11M
R2103	B	C	11L
R2104	B	C	11L
R2105	B	C	14K
R2201	B	C	15M
R2202	B	C	15L
R2203	B	C	15L
R2204	B	C	16L
R2205	B	C	16L
R2206	B	C	16M
R2207	B	C	15L
R2208	B	C	16L
R2209	B	C	16L
R2210	B	C	16L
R2211	B	C	16L
R2212	B	C	18L
R2213	B	C	18M
R2214	B	C	18M
R2215	B	C	18N
R2216	B	C	18N
R2217	B	C	18N
R2218	B	C	17N
R2219	B	C	18N
R2220	B	C	18N
R2221	B	C	18N
R2222	B	C	17N
R2223	B	C	17N
R2224	B	C	17N
R2225	B	C	17N
R2226	B	C	16N
R2227	B	C	16N
R2228	B	C	16M
R2229	B	C	16N
R2230	B	C	15M
R2231	B	C	16M
R2232	B	C	15L
R2233	B	C	17N
R2234	B	C	15L
R2235	B	C	17N
R2240	B	C	16M
R2251	B	C	18J
R2253	B	C	18K
R2254	B	C	18K
R2255	B	C	17K
R2256	B	C	17K
R2257	B	C	14L
R2258	B	C	19K
R2259	B	C	18L
R2260	B	C	18L
R2261	B	C	14L
R2262	B	C	13L
R2711	B	C	14M
R2712	B	C	15M
R2713	B	C	14M
R2714	B	C	15M
R2715	B	C	14M
R2716	B	C	14L
R3001	B	C	15E
R3002	B	C	14F
R3003	B	C	13E
R3004	B	C	13E
R3010	B	C	14E
R3014	B	C	13E
R3015	B	C	13E
R3016	B	C	13E
R3017	B	C	13E
R3018	B	C	13E
R3019	B	C	13D
R3020	B	C	13D
R3021	B	C	13D
R3022	B	C	13D
R3023	B	C	12D
R3024	B	C	13D
R3025	B	C	13C
R3031	B	C	12B
R3032	B	C	12B
R3033	B	C	13B
R3034	B	C	13B
R3035	B	C	12B
R3036	B	C	13B
R3037	B	C	14C
R3038	B	C	14B
R3039	B	C	14B
R3040	B	C	14B
R3041	B	C	15B
R3042	B	C	15B
R3043	B	C	15B
R3044	B	C	15B
R3045	B	C	15B
R3046	B	C	15B
R3047	B	C	15B
R3048	B	C	15B
R3049	B	C	16B
R3050	B	C	15B
R3051	B	C	16B
R3052	B	C	16B
R3053	B	C	16C
R3054	B	C	16C
R3055	B	C	16C
R3056	B	C	16C
R3057	B	C	16C
R3058	B	C	16C
R3059	B	C	16C
R3060	B	C	16C
R3061	B	C	16C
R3062	B	C	16C
R3064	B	C	17B
R3067	B	C	16D
R3068	B	C	17D
R3069	B	C	16D
R3070	B	C	16D
R3071	B	C	16D
R3073	B	C	16E
R3074	B	C	16E
R3075	B	C	16E
R3076	B	C	16E
R3077	B	C	16E
R3078	B	C	16E
R3079	B	C	15E
R3080	B	C	15E
R3201	B	C	3B
R3202	B	C	3A
R3203	B	C	10B
R3204	B	C	10C
R3205	B	C	7H
R3206	B	C	6H
R3207	B	C	7G
R3209	A	D	12C
R3210	B	C	5E
R3211	B	C	20D
R3212	B	C	17A
R3213	B	C	17A
R3214	B	C	10B
R3215	B	C	9B
R3220	B	C	17D
R3221	B	C	5B
R3222	B	C	17P
R3223	B	C	5B
R3224	B	C	5B
R3225	B	C	5B
R3226	B	C	8D
R3227	B	C	8D
R3228	B	C	8E
R3229	B	C	8D
R3230	B	C	13E
R3231	B	C	14E
R3232	B	C	14D
R3233	B	C	20D
R3234	B	C	20D
R3235	B	C	20D
R3236	B	C	20D
R3237	B	C	16E
R3238	B	C	16E
R3239	B	C	16E
R3240	B	C	3B
R3241	B	C	4A
R3242	B	C	3B
R3243	B	C	8B
R3244	B	C	15E
R3246	B	C	15E
R3247	B	C	15E
R3248	B	C	15E
R3249	B	C	15E
R3250	B	C	13E
R3252	B	C	13D
R3253	B	C	14B
R3254	B	C	16E
R3255	B	C	3A
R3256	B	C	7B
R3257	B	C	6B
R3258	B	C	7D
R3259	B	C	7D
R3301	B	C	8D
R3302	B	C	8D
R3303	B	C	8D
R3304	B	C	8C
R3310	B	C	9D
R3314	B	C	8C
R3315	B	C	9C
R3316	B	C	9C
R3317	B	C	9B
R3318	B	C	9C
R3319	B	C	9C
R3320	B	C	9C
R3321	B	C	9C
R3322	B	C	9C
R3323	B	C	10B
R3324	B	C	10C
R3325	B	C	10C
R3326	B	C	10C
R3327	B	C	10C
R3331	B	C	11C
R3332	B	C	11C
R3333	B	C	11C
R3343	B	C	11D
R3344	B	C	11E
R3345	B	C	12E
R3346	B	C	11E
R3347	B	C	11E
R3348	B	C	11E
R3349	B	C	11E
R3350	B	C	11E
R3351	B	C	11E
R3352	B	C	11F
R3353	B	C	11F
R3354	B	C	11F
R3355	B	C	11F
R3356	B	C	11F
R3357	B	C	11E
R3358	B	C	10E
R3359	B	C	10E
R3360	B	C	10F
R3361	B	C	10F
R3362	B	C	10F
R3364	B	C	10F
R3365	B	C	9F
R3366	B	C	9F
R3367	B	C	9F
R3368	B	C	9F
R3369	B	C	9F
R3370	B	C	9E
R3371	B	C	9F
R3373	B	C	9E
R3374	B	C	9F
R3375	B	C	8F
R3376	B	C	8E
R3377	B	C	8E
R3378	B	C	8E
R3379	B	C	8E
R3380	B	C	8E
R3501	B	C	8C
R3502	B	C	8C
R3503	B	C	8C
R3504	B	C	9B
R3505	B	C	8B
R3506	B	C	8C
R3507	B	C	9E
R3508	B	C	20C
R3509	B	C	8D
R3510	B	C	15B
R3511	B	C	13E
R3512	B	C	13F
R3513	B	C	12F
R3514	B	C	12F
R3515	B	C	12F
R3516	B	C	12F
R3517	B	C	9B
R3518	B	C	11B
R4001	B	C	11I
R4003	B	C	10J
R4004	B	C	10J
R4005	B	C	10J
R4006	B	C	11I
R4007	B	C	12I
R4008	B	C	10I
R4009	B	C	10H
R4010	B	C	10I
R4011	B	C	10H
R4012	B	C	8D
R4013	B	C	9J
R4014	B	C	10J
R4015	B	C	10I
R4201	B	C	11H
R4202	B	C	11H
R4203	B	C	11H
R5001	A	D	3Q
R5101	A	D	4M
R5102	A	D	4M
R5103	A	D	4N
R5104	A	D	2K
R5105	A	D	4J
R5106	A	D	2L
R5107	A	D	2J
R5108	B	C	4M
R5109	B	C	2K
R5110	B	C	2K
R5111	B	C	3M
R5112	A	D	2K
R5301	B	C	1G
R5302	B	C	1G
R5303	B	C	1G
R5304	B	C	1G
R5305	A	D	1G
R5307	B	C	4I
R5308	B	C	4G
R5309	B	C	4F
R5310	B	C	4E
R5311	B	C	4E
R5312	B	C	4G
R5313	B	C	4G
R5314	A	D	1G
R5315	B	C	3I
R5316	A	D	4H
R5317	A	D	4I
R5319	A	D	1D
R5320	B	C	1C
R5328	A	D	7C
R5330	B	C	1B
R5331	B	C	1B
R5332	B	C	1B
R5333	A	D	3F
R5334	A	D	3E
R5335	B	C	1G
R5336	B	C	1G
R5337	B	C	2F
R5338	B	C	4G
R5339	B	C	4G
R5340	B	C	3D
R5341	B	C	3D
R5342	B	C	3D
R5343	B	C	3D
R5344	B	C	2C
R5345	B	C	1C
R5346	B	C	2B
R5347	B	C	1B
R5348	B	C	3E
R5349	B	C	3E
R5350	B	C	1E
R5351	B	C	1E
R5352	B	C	4H
R5451	B	C	4F
R5452	A	D	5F
R6001	B	C	21M
R6002	B	C	20M
R6020	B	C	22K
R6021	B	C	22K
R6022	B	C	21K
R6023	B	C	21K
R6030	B	C	21H
R6032	B	C	20I
R6033	B	C	21J
R6034	B	C	21H
R6035	B	C	22K
R6037	B	C	21I
R6038	B	C	22J
R6039	B	C	22J
R6051	B	C	21P
R6052	B	C	21O
R6053	B	C	22O
R6054	B	C	22O
R6071	B	C	22J
R6072	B	C	22J
R6080	B	C	22M
R6081	B	C	22M
R6082	B	C	22N
R6083	B	C	21N
R6084	B	C	21M
R6085	B	C	21M
R6086	B	C	21M
R7161	B	C	13O
R7162	B	C	13P
R7163	B	C	14P
R7164	B	C	14P
R7165	B	C	15P
R7166	B	C	15P
R7167	B	C	15P
R7168	B	C	8A
R7169	B	C	16O
R7170	B	C	16O
R7171	B	C	16O
R7172	A	D	16P
R7173	B	C	15P
R7174	B	C	15O
R7175	B	C	8P
R7176	B	C	8P
R7177	B	C	7P
R7178	B	C	7P
R7179	B	C	7O
R7180	B	C	7O
R7181	A	D	8P
R7182	A	D	7P
R7183	B	C	8P
R7184	B	C	6P
R7185	B	C	8P
R7186	B	C	6P
R7201	B	C	12C
R7221	B	C	11B
R7236	B	C	12B
SWITCH			
S3003	A	D	7A
TEST POINT			
TP106	A	D	21G
TP111	A	D	7L
TP2033	A	D	10L
TP2034	A	D	10K
TP2253	A	D	19L
TP2254	A	D	19L
TP4001	A	D	9L
TPGND	A	D	18P
OTHERS			
CF3001	A	D	13E
CF3301	A	D	8C
CF7201	A	D	12C
F5001	A	D	1P
FL151	A	D	13H
FW2001	A	D	20G
K5101	A	D	3K
LF5001	A	D	2P
LF5002	A	D	5P
PC3001	A	D	17A
PC3002	A	D	9C
PC03115	A	D	15H
PC03894	A	D	10J
PC5101	A	D	4M
PC5301	A	D	1F
T2051	A	D	11K
T2052	A	D	11J
T5001	A	D	1J
TL3001	B	C	17C
TL3003	B	C	14B
TU6001	A	D	21P
UN6701	A	D	22E
VR2251	A	D	14K
VR5301	A	D	2B
X1	A	D	19G
X2	A	D	18G
X3001	A	D	14F
X4201	A	D	11H

WAVEFORMS

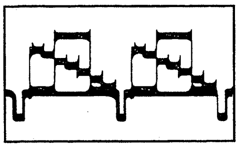
— VIDEO/N.AUDIO —

WF1 IC1-31



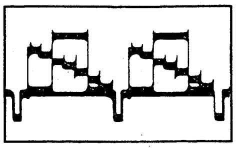
REC 1.0 Vp-p
50 mV/20 μsec/DIV

WF2-1 IC1-23



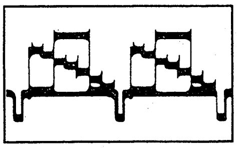
REC 0.46 Vp-p
20 mV/20 μsec/DIV

WF2-1 IC1-23



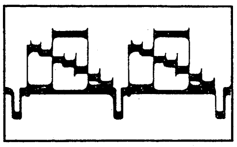
PB 0.57 Vp-p
20 mV/20 μsec/DIV

WF3-1 IC1-19



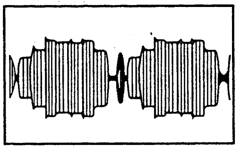
REC 0.48 Vp-p
20 mV/20 μsec/DIV

WF3-2 IC1-19



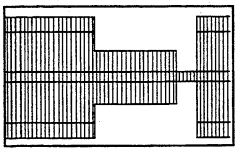
PB 0.57 Vp-p
20 mV/20 μsec/DIV

WF4-1 IC1-58



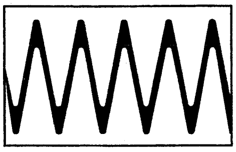
REC 0.4 Vp-p
10 mV/10 μsec/DIV

WF4-2 IC1-58



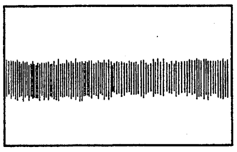
PB 0.42 Vp-p
20 mV/5 msec/DIV

WF5 IC1-4



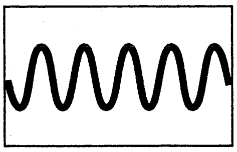
REC 0.84 Vp-p
20 mV/0.5 msec/DIV

WF6 IC1-2



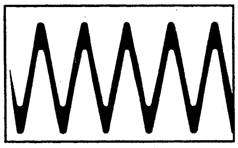
PB 2.5 mVp-p
5 mV/5 msec/DIV

WF7 IC1-9



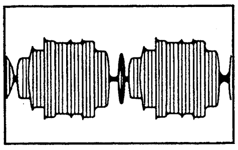
REC 0.12 Vp-p
5 mV/1 msec/DIV

WF8 IC1-11



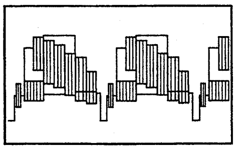
PB 0.68 Vp-p
20 mV/0.5 msec/DIV

WF9 IC1-55



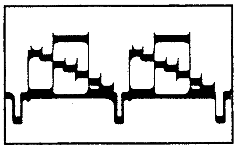
PB 0.62 Vp-p
20 mV/20 μsec/DIV

WF10-1 IC1-52



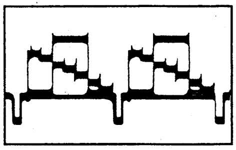
REC 2.2 Vp-p
50 mV/20 μsec/DIV

WF10-2 IC1-52



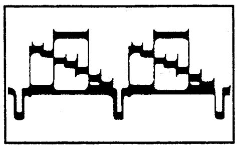
PB 2.2 Vp-p
0.1 V/20 μsec/DIV

WF11-1 IC1-42



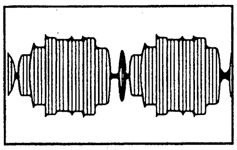
REC 0.37 Vp-p
10 mV/20 μsec/DIV

WF11-2 IC1-42



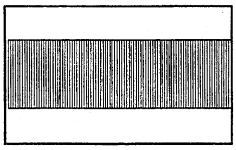
PB 0.47 Vp-p
20 mV/20 μsec/DIV

WF12 IC1-46



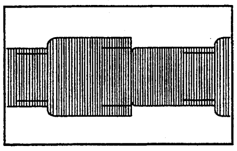
REC/PB 0.25 Vp-p
10 mV/20 μsec/DIV

WF13 IC1-87



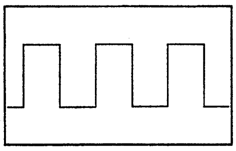
REC 1.5 Vp-p
50 mV/1 msec/DIV

WF14 TP106 PB FM



PB 0.4 Vp-p
10 mV/2 msec/DIV

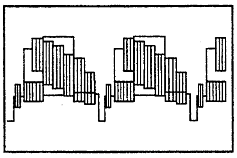
WF15 TP111 D.FF



REC/PB 5.2 Vp-p
0.2 V/10 msec/DIV

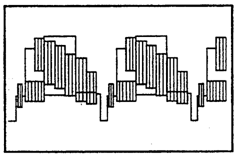
— ON SCREEN —

WF1-1 IC201-15



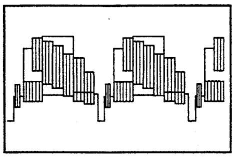
REC 2.15 Vp-p
0.1 V/20 μsec/DIV

WF1-2 IC201-15



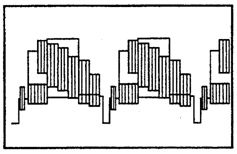
PB 2.3 Vp-p
0.1 V/20 μsec/DIV

WF2-1 IC201-13



REC 2.15 Vp-p
0.1 V/20 μsec/DIV

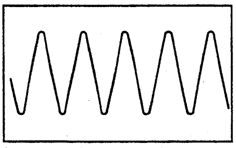
WF2-2 IC201-13



PB 2.3 Vp-p
0.1 V/20 μsec/DIV

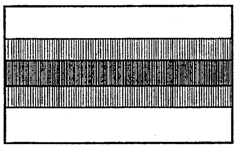
— FMA —

WF1 IC2201-32



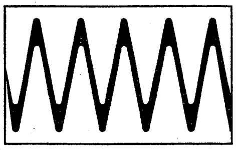
REC 0.1 Vp-p
2 mV/0.5 msec/DIV

WF2 IC2201-15



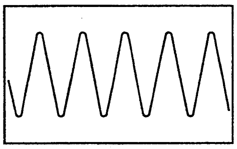
REC 0.28 Vp-p
10 mV/1 msec/DIV

WF3 IC2201-38



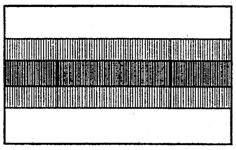
REC 0.12 Vp-p
2 mV/0.5 msec/DIV

WF4 IC2201-45



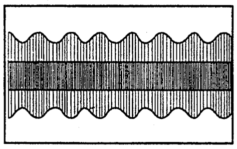
REC/PB 1.1 Vp-p
20 mV/0.5 msec/DIV

WF5 IC2251-13



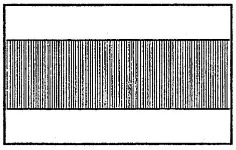
REC 0.25 Vp-p
10 mV/1 msec/DIV

WF6 IC2251-7



REC 2.1 Vp-p
50 mV/2 msec/DIV

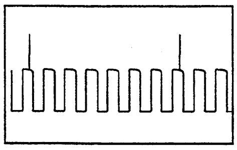
WF7 TP2253 A.PB_FM



PB 1.2 Vp-p
50 mV/5 msec/DIV

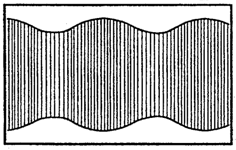
— SERVO —

WF1 IC4001-22 D.PG/FG



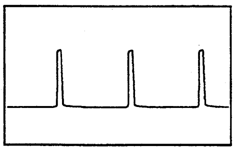
REC/PB 4.0 Vp-p
0.1 V/5 msec/DIV

WF2 IC4001-17 CAP_FG



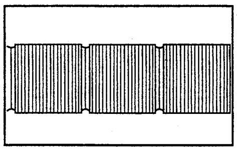
REC/PB 2.0 Vp-p
50 mV/10 msec/DIV

WF3 IC4001-2 C.SYNC



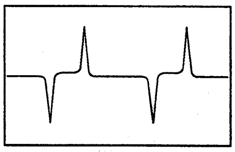
REC 4.8 Vp-p
0.2 V/20 μsec/DIV

WF4 IC4001-3 FSC



REC/PB 0.28 Vp-p
10 mV/5 msec/DIV

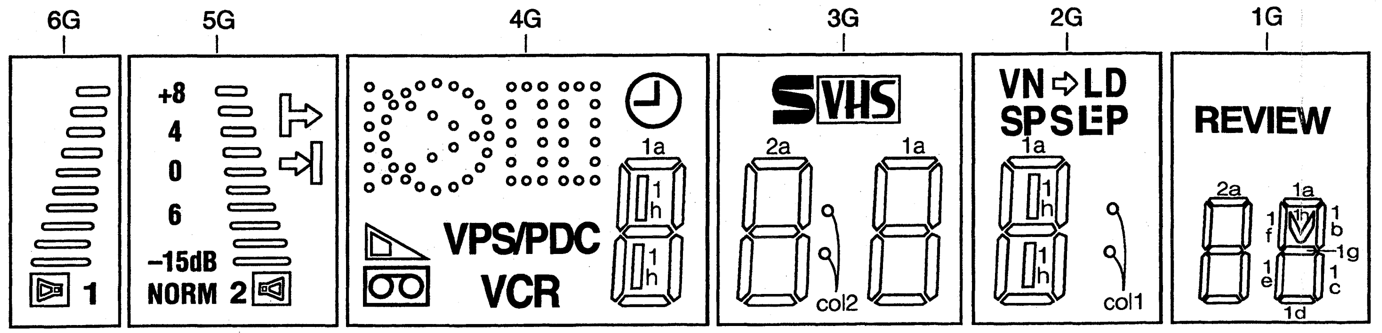
WF5 TP4001 CTL.P

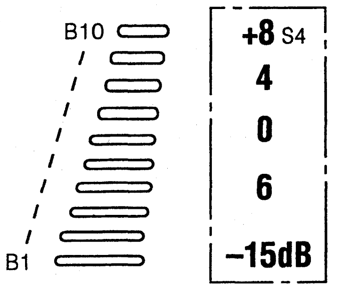


PB 3.0 Vp-p
0.1 V/10 msec/DIV

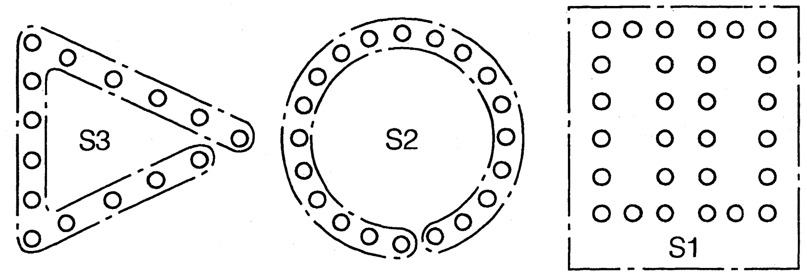
4.11 FDP GRID ASSIGNMENT AND ANODE CONNECTION

GRID ASSIGNMENT


6G
5G
4G
3G
2G
1G
1
+8
4
0
6
-15dB
NORM 2
1a
VPS/PDC
VCR
1h
SVHS
2a
1a
col2
VN⇨LD
SP S LP
1a
1h
col1
REVIEW
2a
1a
1
f
1
b
1g
1
e
1
c
1d


B10
+8 S4
4
0
6
-15dB
B10
B1
B1

(6G, 5G)



(4G)

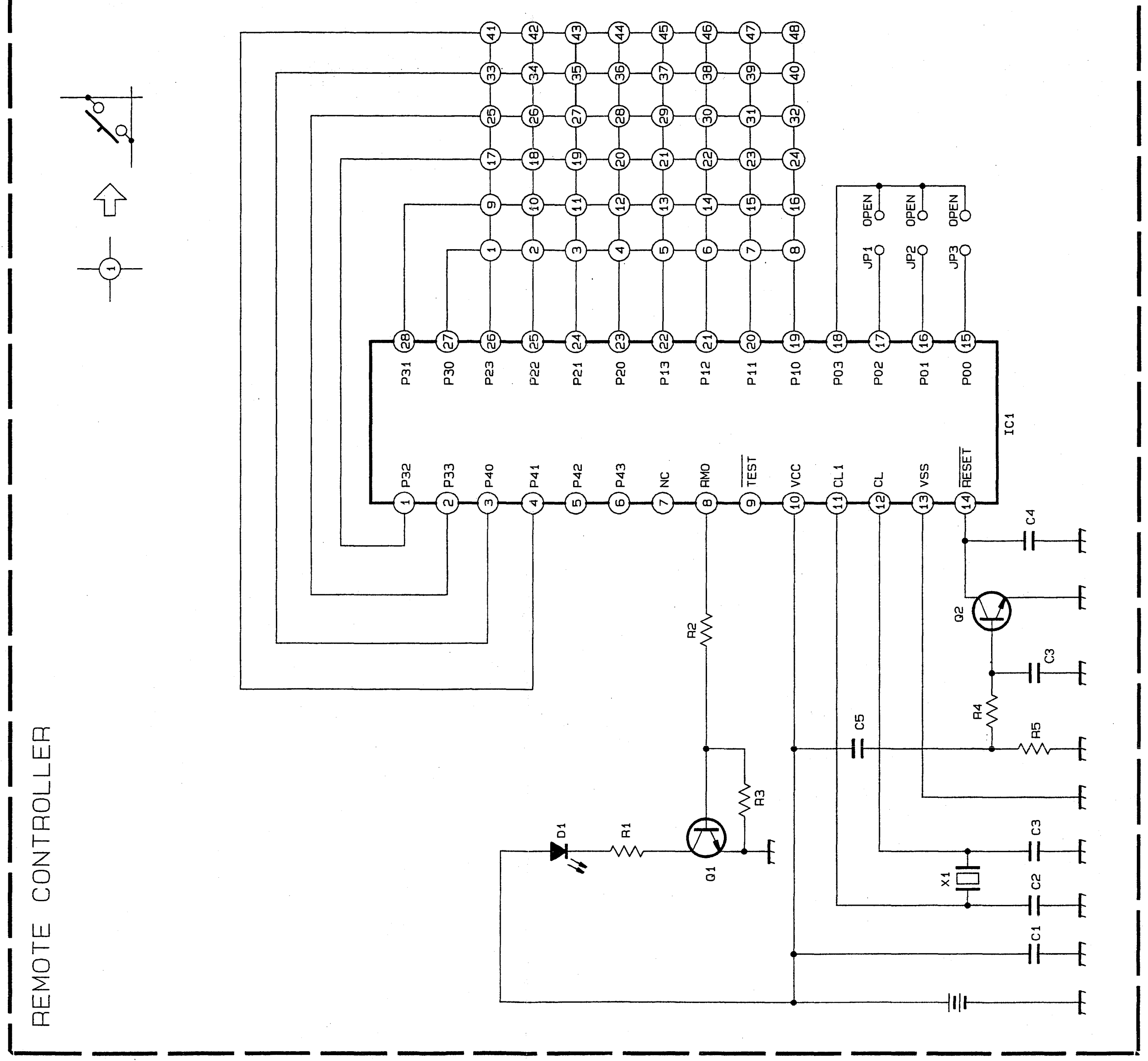
ANODE CONNECTION

	6G	5G	4G	3G	2G	1G
P 1	—	|⇨	S2	1a	1a	1a
P 2	—	⇨|	S1	1b	1b	1b
P 3	—	S4	S3	1f	1f	1f
P 4	—	NORM	VPS/PDC	1g	1g	1g
P 5	1	2	◷	1c	1c	1c
P 6	▣	▣	◺	1e	1e	1e
P 7	B10	B10	⊙⊙	1d	1d	1d
P 8	B9	B9	VCR	col2	1h	1h
P 9	B8	B8	1a	2a	col1	2a
P10	B7	B7	1b	2b	⇨	2b
P11	B6	B6	1f	2f	VN	2f
P12	B5	B5	1g	2g	LD	2g
P13	B4	B4	1c	2c	SP	2c
P14	B3	B3	1e	2e	S (SEP)	2e
P15	B2	B2	1d	2d	: (SEP)	2d
P16	B1	B1	1h	SVHS	LP(SEP)	REVIEW

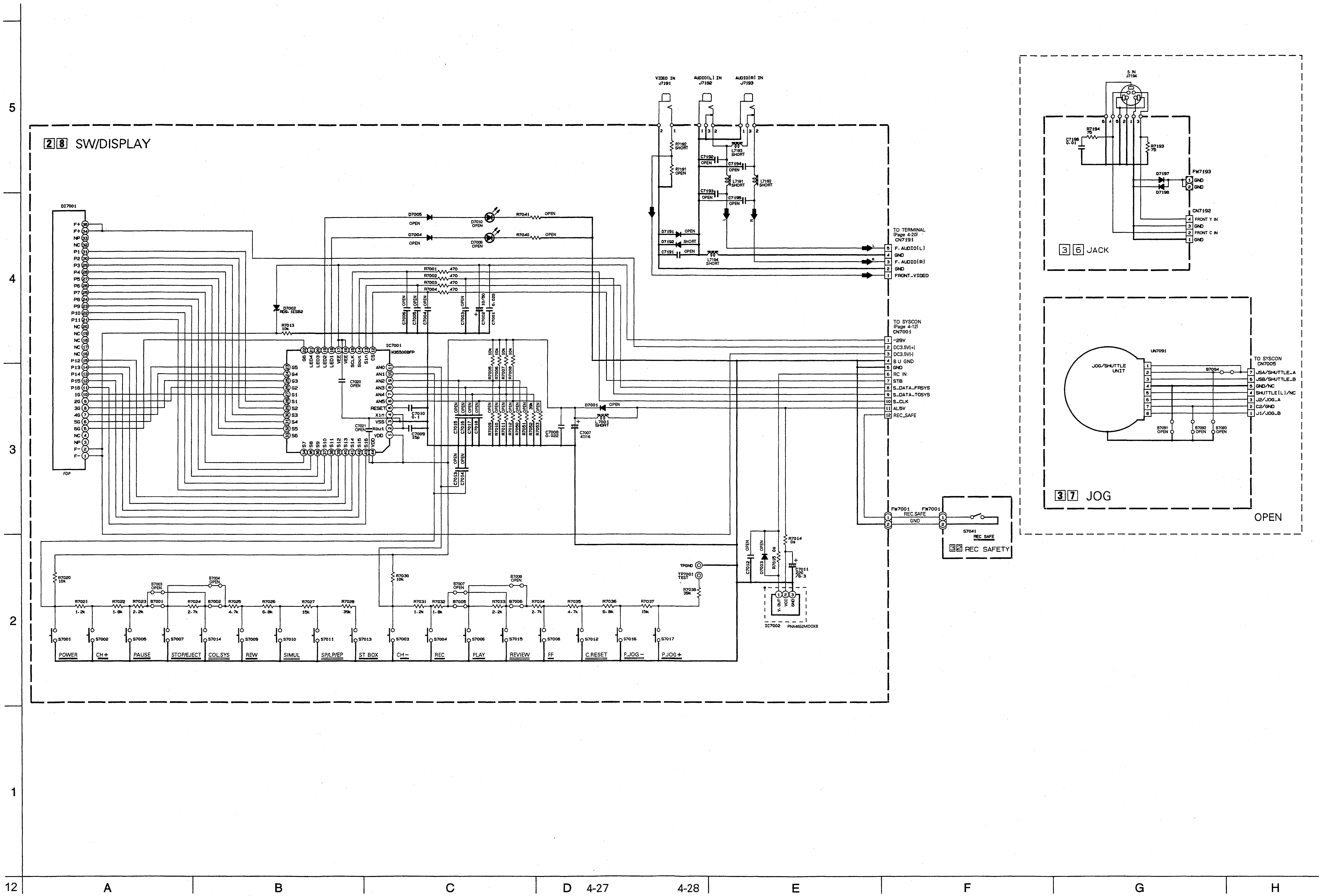
4.12 REMOTE CONTROL SCHEMATIC DIAGRAM

NOTES:
1.All parts shown in this schematic are critical for safety.
2.This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.

Key No.	Key Name
1	START+
2	DIGIT1
3	DIGIT4
4	STOP+
5	DATE+
6	CH+
7	DIGIT3
8	DIGIT6
9	CANCEL/C.RESET
10	DIGIT2
11	DIGIT7
12	DIGIT0
13	DIGIT8
14	TIMER
15	DIGIT5
16	DIGIT9
17	PROG.
18	CABLE/DSS
19	TV
20	PROG CHECK
21	SP/EP
22	SKIP SEARCH
23	POWER
24	MBR SET/A/B
25	START-
26	TV/VCR
27	RE-VIRE
28	STOP-
29	DATE-
30	CH-
31	DISPLAY
32	ENTER/OSD
33	MENU
34	REC
35	REW
36	PLAY
37	STOP
38	FF
39	PAUSE/STILL
40	OK
41	<</TV VOL-
42	--
43	--
44	--
45	^/TV CH+
46	v/TV CH-
47	--
48	<</TV VOL-
34+36	REC START
34+39	REC PAUSE

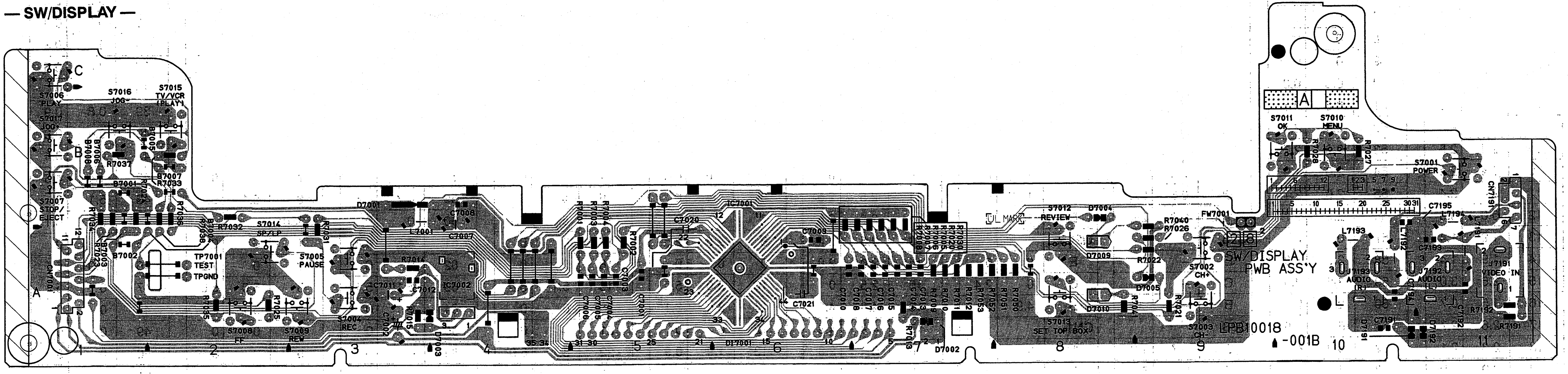

REMOTE CONTROLLER
IC1
P31
P30
P23
P22
P21
P20
P13
P12
P11
P10
P03
P02
P01
P00
P32
P33
P40
P41
P42
P43
NC
RMO
TEST
VCC
CL1
CL
VSS
RESET
JP1
JP2
JP3
OPEN
OPEN
OPEN
C1
C2
C3
C4
C5
R1
R2
R3
R4
R5
Q1
Q2
D1
X1
A
B
C
D
1
2
3
4
5

4.13 SW/DISPLAY AND REC SAFETY SCHEMATIC DIAGRAMS

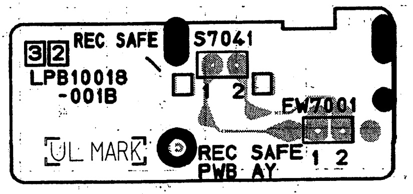

5
4
3
2
1
12
A
B
C
D
E
F
G
H
28 SW/DISPLAY
DI7001
FDP
F+
NP
NC
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
1G
2G
3G
4G
5G
6G
F-
IC7001
M35500BFP
G6
LED4
LED3
LED2
LED1
VEE
SCLK
Sout
Sin
CS
G5
G4
G3
G2
G1
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
AN0
AN1
AN2
AN3
AN4
AN5
RESET
Xin
VSS
Xout
VDD
D7005
D7004
D7010
D7009
D7002
RD9.1ESB2
R7013
10k
R7041
R7040
OPEN
R7001
R7002
R7003
R7004
470
C7006
C7005
C7004
C7003
C7002
C7001
10/50
0.022
C7020
C7010
0.1
C7021
C7009
15p
C7015
C7016
C7017
C7018
C7013
C7014
R7009
R7010
R7011
R7012
R7051
R7052
R7053
R7005
R7006
R7007
R7008
10k
39k
D7001
L7001
SHORT
C7008
0.022
C7007
47/16
VIDEO IN
J7191
AUDIO(L) IN
J7192
AUDIO(R) IN
J7193
R7192
SHORT
R7191
OPEN
C7192
C7194
C7193
C7195
L7193
L7191
L7192
L7194
D7191
D7192
C7191
TO TERMINAL
(Page 4-20)
CN7191
F. AUDIO(L)
GND
F. AUDIO(R)
GND
FRONT_VIDEO
TO SYSCON
(Page 4-12)
CN7001
-29V
DC3.5V(+)
DC3.5V(-)
B U GND
GND
RC IN
STB
S_DATA_FRSYS
S_DATA_TOSYS
S_CLK
AL5V
REC_SAFE
FW7001
REC.SAFE
GND
S7041
REC SAFE
32 REC SAFETY
TPGND
TP7001
TEST
R7038
39k
R7014
0Ω
R7015
0Ω
D7003
C7012
C7011
220
/6.3
IC7002
PNA4652M00XB
V.OUT
VCC
GND
R7020
10k
R7030
10k
R7021
1.2k
R7022
1.8k
R7023
2.2k
B7001
B7003
B7004
R7024
2.7k
B7002
R7025
4.7k
R7026
6.8k
R7027
15k
R7028
39k
R7031
1.2k
R7032
1.8k
B7005
B7007
B7008
R7033
2.2k
B7006
R7034
2.7k
R7035
4.7k
R7036
6.8k
R7037
15k
S7001
S7002
S7005
S7007
S7014
S7009
S7010
S7011
S7013
S7003
S7004
S7006
S7015
S7008
S7012
S7016
S7017
POWER
CH+
PAUSE
STOP/EJECT
COL.SYS
REW
SIMUL
SP/LP/EP
ST BOX
CH-
REC
PLAY
REVIEW
FF
C.RESET
P.JOG-
P.JOG+
S IN
J7194
R7194
75
C7196
0.01
R7193
75
D7197
D7198
FW7193
GND
CN7192
FRONT Y IN
GND
FRONT C IN
GND
36 JACK
UN7091
JOG/SHUTTLE
UNIT
B7094
B7091
B7092
B7093
OPEN
TO SYSCON
CN7005
JSA/SHUTTLE_A
JSB/SHUTTLE_B
GND/NC
SHUTTLE(L)/NC
J2/JOG_A
C2/GND
J1/JOG_B
37 JOG
OPEN

4.14 SW/DISPLAY AND REC SAFETY CIRCUIT BOARDS

— SW/DISPLAY —


S7016 JOG
S7015 TV/VCR (PLAY)
S7006 PLAY
S7017
S7007 STOP/EJECT
R7037
R7001
R7007
R7033
R7032
S7014 SP/LP
S7005 PAUSE
TP7001 TEST
TPGND
S7008 FF
S7009 REW
S7004 REC
S7012
IC7002
L7001
C7007
C7008
D7001
D7003
IC7001
C7020
C7009
C7021
DI7001
UL MARK
S7012 REVIEW
D7004
R7040
R7026
FW7001
D7009
R7022
S7002 CH+
D7005
D7010
S7013 SET TOP BOX
S7003 CH-
D7002
SW/DISPLAY PWB ASS'Y
LPB10018 -001B
S7011 OK
S7010 MENU
S7001 POWER
CN7191
C7195
L7193
J7193 AUDIO (R)
J7192 AUDIO (L)
J7191 VIDEO IN
R7192
R7191
D7191
D7192
A
B
C
1
2
3
4
5
6
7
8
9
10
11

— REC SAFETY —


32
REC SAFE
S7041
LPB10018 -001B
1 2
FW7001
UL MARK
REC SAFE PWB AY
1 2

COMPONENT PARTS LOCATION GUIDE <SW/DISPALY>

REF.NO.	LOCATION		
CAPACITOR			
C7001	A	D	5A
C7002	A	D	3A
C7003	A	D	5A
C7004	A	D	5A
C7005	A	D	5A
C7006	A	D	5A
C7007	A	D	4B
C7008	A	D	4B
C7009	A	D	6A
C7010	A	D	6A
C7011	A	D	3A
C7012	A	D	3A
C7013	A	D	7A
C7014	A	D	7A
C7015	A	D	7A
C7016	A	D	7A
C7017	A	D	7A
C7018	A	D	7A
C7020	A	D	5A
C7021	A	D	6A
C7191	A	D	10A
C7192	A	D	11A
C7193	A	D	11A
C7194	A	D	10A
C7195	A	D	11A
CONNECTOR			
CN7001	A	D	1A
CN7191	A	D	11B
DIODE			
D7001	A	D	3B
D7002	A	D	7A
D7003	A	D	4A
D7004	A	D	8B
D7005	A	D	9A
D7009	A	D	8A
D7010	A	D	8A
D7191	A	D	10A
D7192	A	D	11A
IC			
IC7001	B	C	6A
IC7002	A	D	4A
JACK			
J7191	A	D	11A
J7192	A	D	11A
J7193	A	D	10A
COIL			
L7001	A	D	4B
L7191	A	D	11A
L7192	A	D	10A
L7193	A	D	10A
L7194	A	D	11A
RESISTOR			
R7001	A	D	5A
R7002	A	D	5A
R7003	A	D	5A
R7004	A	D	5A
R7005	A	D	7A
R7006	A	D	7A
R7007	A	D	7A
R7008	A	D	6A
R7009	A	D	7A
R7010	A	D	7A
R7011	A	D	7A
R7012	A	D	7A
R7013	A	D	7A
R7014	A	D	3A
R7015	A	D	3A
R7020	A	D	7B
R7021	A	D	9A
R7022	A	D	9A
R7023	A	D	1A
R7024	A	D	1B
R7025	A	D	2A
R7026	A	D	9A
R7027	A	D	10B
R7030	A	D	7B
R7031	A	D	3B
R7032	A	D	2B
R7033	A	D	2B
R7034	A	D	1B
R7035	A	D	2A
R7036	A	D	2A
R7037	A	D	1B
R7038	A	D	2A
R7040	A	D	9A
R7041	A	D	8A
R7050	A	D	8A
R7051	A	D	8A
R7052	A	D	7A
R7053	A	D	7A
R7191	A	D	11A
R7192	A	D	11A
SWITCH			
S7001	A	D	11B
S7002	A	D	9A
S7003	A	D	9A
S7004	A	D	3A
S7005	A	D	3A
S7006	A	D	1C
S7007	A	D	1B
S7008	A	D	2A
S7009	A	D	3A
S7010	A	D	10B
S7011	A	D	10B
S7012	A	D	8A
S7013	A	D	8A
S7014	A	D	2A
S7015	A	D	2B
S7016	A	D	1B
S7017	A	D	1B
TEST POINT			
TP7001	A	D	1A
TPGND	A	D	1A
OTHERS			
DI7001	A	D	6A
FW7001	A	D	9B

4.15 VOLTAGE CHARTS

<VIDEO/N.AUDIO>

MODE PIN NO.	REC	PLAY
IC1		
1	2.5	2.5
2	2.5	2.4
3	0	0
4	2.2	2.4
5	0	0
6	0.4	0.9
7	2.5	2.5
8	–	–
9	2.4	2.5
10	2.4	2.4
11	2.4	2.4
12	5.0	5.0
13	1.9	1.4
14	1.9	1.4
15	2.6	3.0
16	1.5	0.7
17	2.6	2.7
18	2.3	2.1
19	3.0	3.0
20	2.7	2.7
21	2.2	2.3
22	1.9	2.1
23	3.0	3.0
24	2.1	2.1
25	1.4	1.4
26	2.1	2.0
27	0	0
28	2.8	2.8
29	1.9	1.9
30	2.6	2.8
31	2.8	2.8
32	0	0
33	0	0
34	0	0
35	3.1	3.0
36	5.0	5.0
37	0	0
38	5.0	5.0
39	3.1	3.1
40	5.0	5.0
41	5.0	5.0
42	2.0	2.1
43	5.0	5.0

MODE PIN NO.	REC	PLAY
44	2.6	2.6
45	0	0
46	2.0	2.0
47	0	0
48	0	0
49	0	0
50	0.3	0.3
51	0.6	0.6
52	2.4	2.4
53	2.8	2.7
54	2.0	1.9
55	2.0	2.1
56	2.3	2.7
57	0	0
58	3.0	3.0
59	3.5	3.6
60	2.1	2.1
61	5.0	5.0
62	4.8	4.8
63	4.8	4.8
64	0	0
65	2.4	2.4
66	5.0	5.0
67	5.0	5.0
68	0	0
69	2.8	2.8
70	2.8	2.8
71	2.1	2.1
72	0	2.2
73	–	–
74	2.6	1.0
75	–	–
76	2.5	2.5
77	4.8	4.5
78	2.7	2.8
79	4.3	2.1
80	0	0
81	–	2.4
82	1.2	1.1
83	2.5	2.5
84	0	1.1
85	0	0
86	2.4	2.3
87	2.2	2.2

MODE PIN NO.	REC	PLAY
88	2.2	2.2
89	0	2.2
90	5.0	5.0
91	0	0
92	0	0
93	0	0
94	0	0
95	2.8	2.8
96	5.0	5.1
97	0	0
98	5.0	5.0
99	0.6	2.6
100	2.6	2.5
Q26		
E	–	–
C	–	–
B	–	–
Q38		
E	1.7	1.0
C	5.0	5.0
B	2.4	1.6
Q39		
E	–	–
C	–	–
B	–	–
Q152		
E	5.0	4.9
C	O	O
B	4.3	4.3
Q2001		
E	–12.4	0
C	0	0
B	–18.4	0.7
Q2002		
E	–12.3	0
C	0	0
B	–18.2	0.7
Q2003		
E	5.0	5.1
C	–18.3	5.0
B	4.9	0
Q2051		
E	0	0
C	8.1	0.3

MODE PIN NO.	REC	PLAY
B	0.5	0.3
Q2052		
E	11.3	11.4
C	11.2	2.4
B	10.6	11.4
Q2053		
E	0	0
C	0	11.3
B	5.0	0
Q2054		
E	11.2	2.4
C	11.0	0
B	10.4	2.4
Q2055		
E	0	0
C	0	2.4
B	4.9	0
CN1		
1	0	0
2	0	0
3	0	0
4	0	0
5	2.3	2.2
6	2.3	2.2
7	2.2	2.2
8	2.2	2.2
9	4.4	0
10	0	0
11	4.4	0
CN2001		
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	1.7	2.5
7	2.0	2.5
CN2002		
1	0	0
2	0	0

<FMA>

MODE PIN NO.	REC	PLAY
IC2201		
1	0	0
2	0	0
3	2.5	2.5
4	0	0
5	0	0
6	2.5	2.5
7	0	0
8	2.5	2.5
9	1.5	1.5
10	0	0
11	2.5	2.5
12	2.5	2.5
13	2.5	2.4
14	2.0	2.0
15	2.5	0
16	4.8	4.8
17	4.9	4.8
18	0	2.8
19	0	0
20	0	0
21	0	2.7
22	–	–
23	0	0
24	2.0	2.1
25	2.5	2.4
26	2.5	2.5
27	0	2.5
28	0	0
29	1.6	1.5
30	2.6	2.5
31	5.0	5.0
32	0	0
33	2.5	2.5
34	0	0
35	0	0
36	0	0
37	2.4	2.5
38	2.5	2.5
39	9.3	9.4
40	0	0.5
41	4.3	4.3
42	0	0
43	0	0

MODE PIN NO.	REC	PLAY
44	0	0
45	4.3	4.3
46	4.6	4.4
47	3.6	3.1
48	1.0	3.0
IC2251		
1	0	–
2	4.4	0
3	0.5	0.6
4	0	0
5	0.6	0.6
6	4.4	0
7	0	0
8	2.5	2.5
9	0	0
10	5.0	5.0
11	3.0	3.1
12	0	0
13	1.9	0.9
14	1.9	1.9
15	0	0
16	4.5	0.9
Q2251		
E	4.4	0
C	4.5	0.9
B	0.5	0.4
Q2254		
E	–	–
C	–	–
B	–	–
Q2255		
E	–	–
C	–	–
B	–	–

<SYSCON>

MODE PIN NO.	REC	PLAY
IC3001		
1	1.0	3.0
2	3.6	3.1
3	0	0

MODE PIN NO.	REC	PLAY
4	5.0	5.0
5	0	0
6	0	0
7	–	–
8	–	–
9	0	0
10	–	–
11	–	–
12	5.1	5.1
13	0	0
14	0	0
15	4.9	0
16	5.1	5.1
17	0	0
18	0	0
19	5.1	5.0
20	0	0
21	0	0
22	5.1	5.0
23	0	0
24	0	0
25	0	0
26	0	0.3
27	0	0
28	0.8	0.7
29	2.1	2.3
30	4.4	4.4
31	0.4	0.4
32	0.4	0.4
33	0.7	0.9
34	0	0
35	0.4	0
36	0.3	0.4
37	0	0
38	0.3	0.3
39	5.0	0
40	2.1	0
41	5.1	5.0
42	0	0
43	0	0
44	5.0	5.0
45	0	0
46	0	0
47	0	0

MODE PIN NO.	REC	PLAY
48	0	0
49	0	0
50	5.1	5.0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	–	–
57	1.3	1.2
58	5.1	5.1
59	4.7	4.6
60	0	0
61	4.5	4.6
62	0	0
63	5.1	5.1
64	0	0
65	0	0
66	–	–
67	–	0
68	0	0
69	3.3	–
70	–	–
71	–	–
72	5.1	5.1
73	5.1	5.1
74	0	5.1
75	5.1	5.1
76	5.1	5.1
77	4.5	4.5
78	0	0
79	0	0
80	0	0
IC3002		
1	0	0
2	12.2	12.2
3	0	0
4	–	–
5	0	0
6	12.2	12.2
7	0	0
8	12.1	12.2
9	0	0
IC3003		

MODE PIN NO.	REC	PLAY
1	0	0
2	5.1	5.1
3	0	5.1
IC3004		
1	0	0
2	0	0
3	0	0
4	0	0
5	–	–
6	–	–
7	0	0
8	5.1	5.1
IC3301		
1	0	0
2	0	1.2
3	5.0	5.0
4	5.1	5.1
5	0	0
6	0	0
7	–	–
8	5.1	5.1
9	0	0
10	–	–
11	–	–
12	4.6	4.6
13	0	0
14	5.0	5.1
15	5.1	5.1
16	0	0
17	0	0
18	0	0
19	4.6	4.7
20	4.9	5.0
21	4.8	4.7
22	–	–
23	–	–
24	3.2	0
25	4.9	4.9
26	0	0
27	0	0
28	0	0
29	–	–
30	0.7	0.8
31	0	0

MODE PIN NO.	REC	PLAY
32	5.1	5.1
33	0	0
34	0.3	0.3
35	0.3	0.3
36	0	0.3
37	0.4	0.5
38	0	0
39	0.8	0.9
40	0.4	0.3
41	0.4	0.4
42	4.4	4.3
43	5.1	0
44	0	5.1
45	0	0
46	5.0	5.1
47	0	5.1
48	0	0
49	0	0
50	0	0
51	0	0
52	5.1	–
53	0	0
54	0	0
55	0	0
56	0	0
57	5.1	5.1
58	0	0
59	5.1	5.1
60	0	0
61	0	0
62	0	0
63	5.1	5.1
64	0	0
65	0	0
66	0	0
67	5.1	5.1
68	5.1	5.0
69	0	0
70	5.1	5.1
71	–	–
72	5.1	5.1
73	5.1	5.1
74	2.7	2.8
75	1.5	1.5

MODE PIN NO.	REC	PLAY
76	2.5	2.5
77	0	0
78	0	0
79	0	0
80	4.3	4.3
Q3001		
E	0	0
C	4.6	4.7
B	–	–
Q3002		
E	0	0
C	4.9	5.1
B	–	–
Q3003		
E	0	0
C	0	0
B	0.7	0.7
Q3005		
E	0	0
C	12.3	12.2
B	0	0
CN3001		
1	0	0
2	2.5	2.5
3	2.5	2.5
4	5.0	5.0
5	11.5	11.5
6	0	0
7	–	–
8	0	0
CN3003		
1	4.9	0
2	3.3	0
CN3004		
1	5.1	5.1
2	5.1	5.1
3	0	0
4	0	0
CN3005		
1	5.1	5.1
2	5.1	5.1
3	4.7	4.7
4	5.1	5.1
5	1.4	–

MODE PIN NO.	REC	PLAY
6	4.6	4.6
7	5.1	5.1
8	0	0
9	0	0
10	–20.2	–20.2
11	–16.7	–16.7
12	–29.0	–29.0
CN3008		
1	0.5	0.5
2	0	0

<SWITCHING REGULATOR>

MODE PIN NO.	REC	PLAY
Q5101		
S	0	0
D	171.2	169.9
G	5.9	5.7
Q5102		
E	0	0
C	5.9	5.7
B	0	0
Q5304		
E	0	0
C	0	0
B	4.6	4.5
Q5305		
E	0	0
C	11.0	11.0
B	0.5	0.6
Q5306		
E	5.2	5.2
C	6.0	6.0
B	5.8	5.8
Q5315		
E	5.2	5.1
C	5.9	5.9
B	5.8	5.8
Q5316		
E	0	0
C	5.8	5.8

MODE PIN NO.	REC	PLAY
B	0.6	0.6
Q5319		
E	11.3	11.4
C	12.2	12.3
B	12.0	12.1
Q5320		
E	12.2	12.3
C	12.2	12.2
B	0	0
Q5451		
E	–	–
C	–	–
B	–	–
Q5452		
E	–	–
C	–	–
B	–	–

<TUNER>

MODE PIN NO.	REC	PLAY
Q6033		
E	–	–
C	–	–
B	–	–
Q6035		
E	–	–
C	–	–
B	–	–

<SERVO>

MODE PIN NO.	REC	PLAY
IC4001		
1	0	0
2	0.3	0.3
3	2.4	2.4
4	0	0
5	3.1	0

MODE PIN NO.	REC	PLAY
6	5.1	–
7	1.6	1.6
8	3.0	3.0
9	5.1	5.1
10	2.5	2.5
11	2.5	2.5
12	2.5	2.5
13	1.7	2.5
14	2.8	2.5
15	2.5	2.5
16	0	0
17	2.4	2.4
18	0	0
19	0.5	0.5
20	0	–
21	–	–
22	1.7	1.6
23	5.0	5.1
24	–	–
Q4201		
E	–	–
C	–	–
B	–	–
CN4001		
1	12.2	12.2
2	0	0
3	1.5	1.5
4	1.5	1.5

<TERMINAL MAIN>

MODE PIN NO.	REC	PLAY
Q7162		
E	–	–
C	–	–
B	–	–
CN7162		
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0

<ON SCREEN>

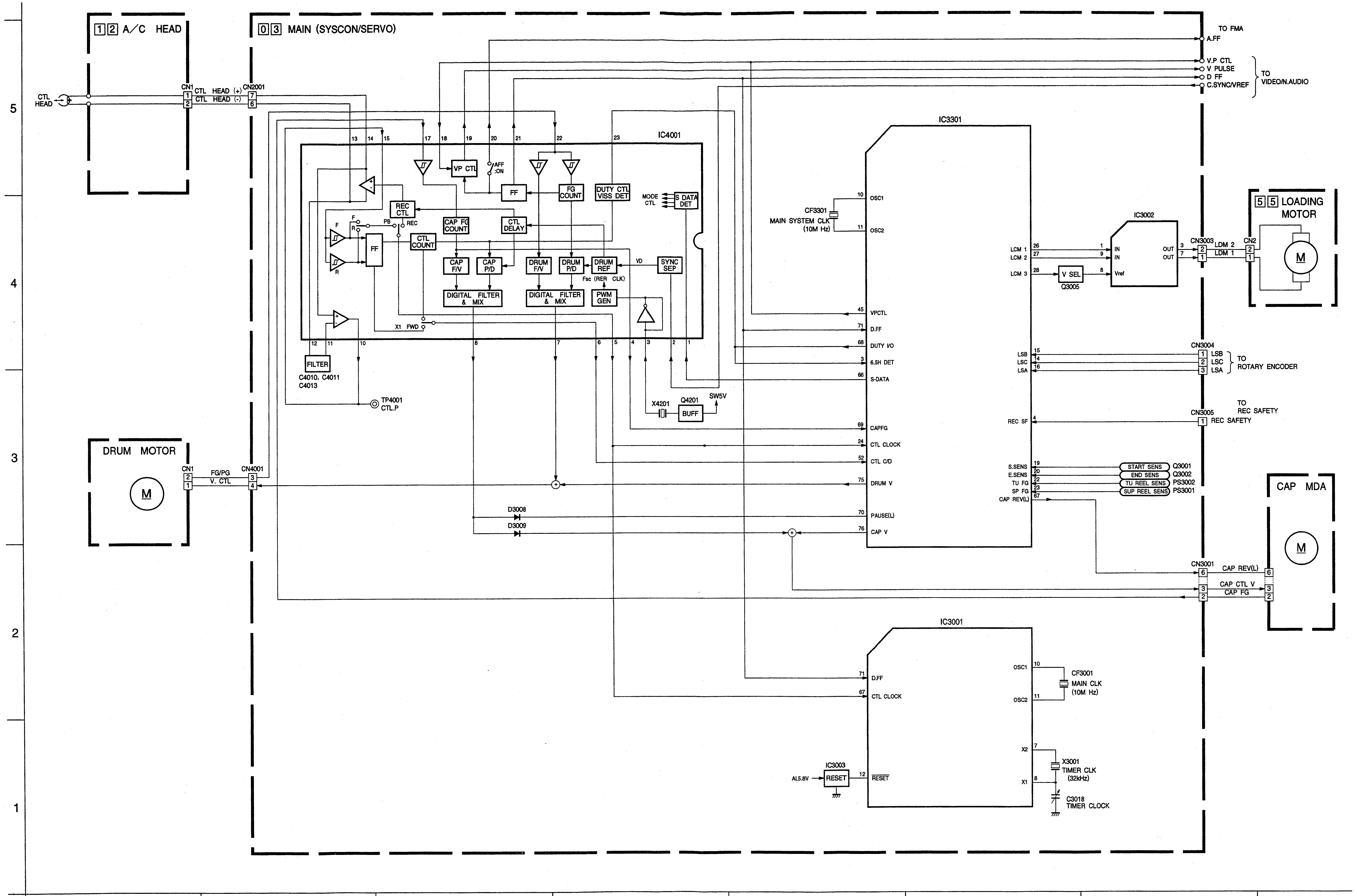
MODE PIN NO.	REC	PLAY
IC201		
1	0	0
2	2.7	2.7
3	5.1	5.1
4	0	0
5	–	–
6	–	–
7	–	–
8	5.1	5.1
9	–	–
10	4.7	4.7
11	1.5	1.4
12	5.1	5.1
13	5.1	5.1
14	2.9	2.9
15	0	0
16	1.2	1.2
17	2.6	2.6
18	5.1	5.1
19	2.1	2.2
20	0	0
21	2.2	2.2
22	1.7	1.7
23	5.1	5.1
24	3.0	3.0
25	2.6	2.6
26	–	–
27	5.1	5.1
28	3.7	3.7
29	5.1	5.1
30	5.1	5.1
Q203		
E	1.5	1.6
C	5.1	5.1
B	2.2	2.2

<SW/DISPLAY>

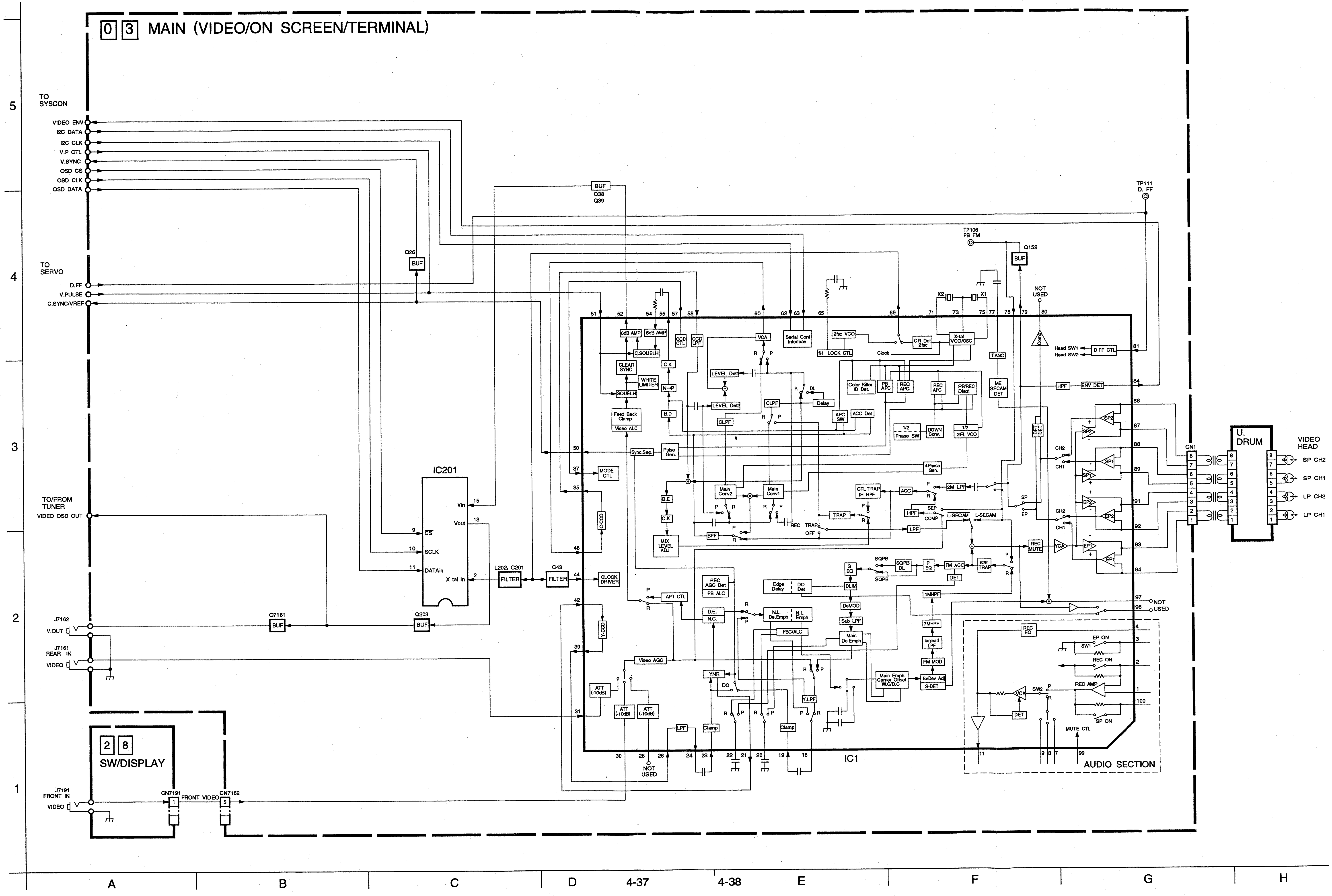
MODE PIN NO.	REC	PLAY
IC7001		
1	5.1	5.1
2	2.1	2.1
3	0	0
4	2.1	2.1
5	5.1	5.1
6	4.0	4.0
7	2.6	2.6
8	3.0	3.1
9	3.0	3.0
10	5.1	5.1
11	5.1	5.1
12	4.6	4.6
13	1.4	1.4
14	5.1	5.1
15	4.7	4.8
16	–29.1	–29.0
17	–29.1	–29.0
18	–	–
19	–	–
20	–	–
21	–	–
22	–	–
23	–	–
24	–	–
25	–	–
26	–	–
27	–	–
28	–	–
29	–	–
30	–	–
31	–	–
32	–	–
33	–	–
34	–	–
35	–	–
36	–	–
37	–	–
38	–	–
39	–	–
40	–	–
41	–	–
42	–	–
43	–	–

MODE PIN NO.	REC	PLAY
44	5.1	5.1
IC7002		
1	5.1	5.1
2	5.1	5.1
3	0	0
CN7001		
1	5.1	5.1
2	5.1	5.1
3	4.7	4.7
4	5.1	5.1
5	1.4	–
6	4.6	4.6
7	5.1	5.1
8	0	0
9	0	0
10	–20.2	–20.2
11	–16.7	–16.7
12	–29.0	–29.0
CN7191		
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0

4.16 SYSTEM CONTROL/SERVO BLOCK DIAGRAM

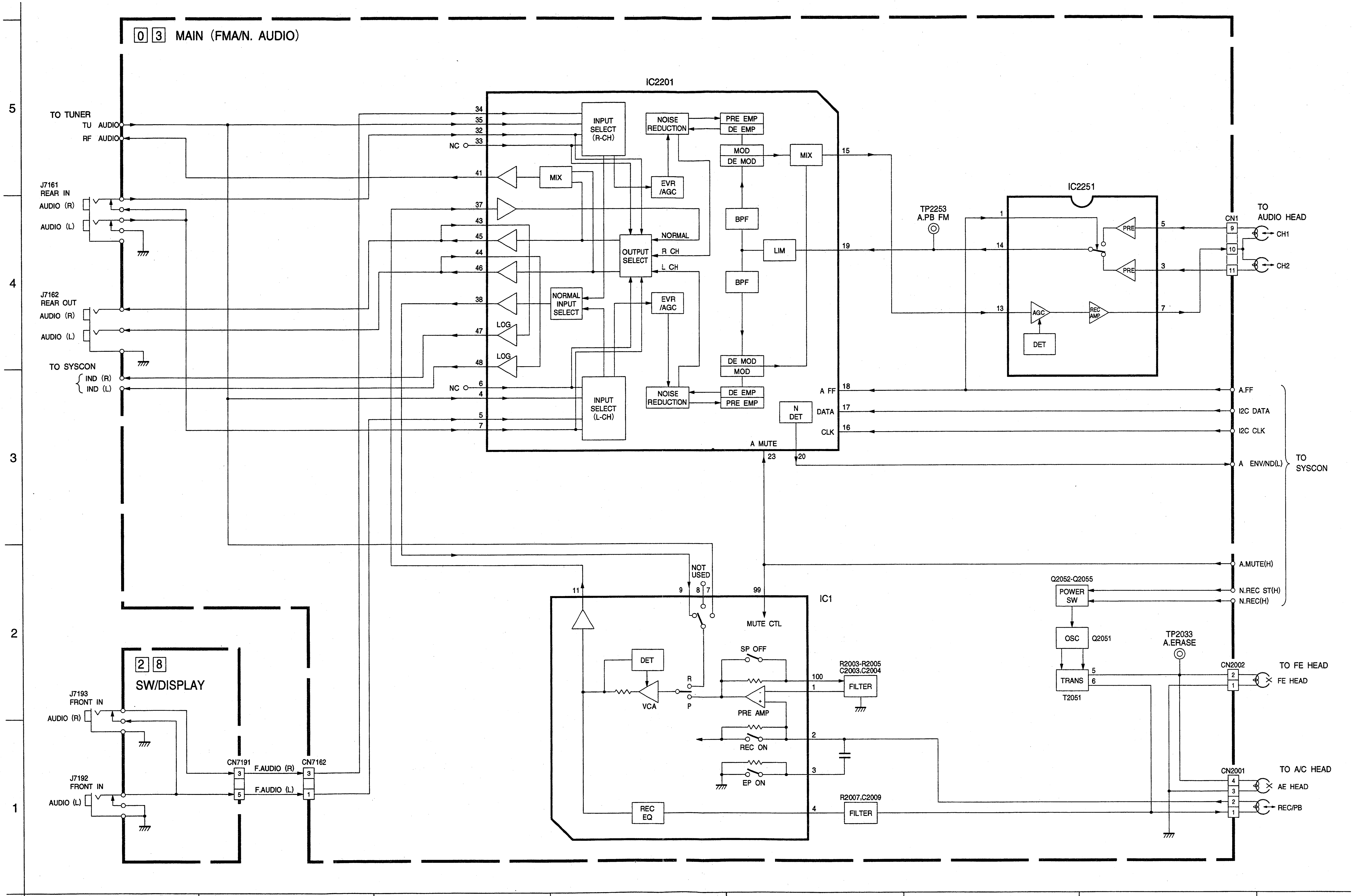

1 2 A／C HEAD
CTL HEAD
CN1
CTL HEAD (+)
CTL HEAD (-)
CN2001
0 3 MAIN (SYSCON/SERVO)
TO FMA
A.FF
V.P CTL
V PULSE
D FF
C.SYNC/VREF
TO VIDEO/N.AUDIO
IC4001
13
14
15
17
18
19
20
21
22
23
VP CTL
AFF :ON
FF
FG COUNT
DUTY CTL VISS DET
MODE CTL
S DATA DET
REC CTL
CAP FG COUNT
CTL DELAY
F
R
PB
REC
FF
CTL COUNT
CAP F/V
CAP P/D
DRUM F/V
DRUM P/D
DRUM REF
VD
SYNC SEP
Fsc (REF CLK)
DIGITAL FILTER & MIX
DIGITAL FILTER & MIX
PWM GEN
X1 FWD
12
11
10
8
7
6
5
4
3
2
1
FILTER
C4010, C4011
C4013
TP4001
CTL.P
X4201
Q4201
BUFF
SW5V
DRUM MOTOR
M
CN1
FG/PG
V. CTL
CN4001
D3008
D3009
IC3301
CF3301
MAIN SYSTEM CLK
(10M Hz)
10 OSC1
11 OSC2
45 VPCTL
71 D.FF
68 DUTY I/O
3 6.5H DET
66 S-DATA
69 CAPFG
24 CTL CLOCK
52 CTL C/D
75 DRUM V
70 PAUSE(L)
76 CAP V
LCM 1 26
LCM 2 27
LCM 3 28
V SEL
Q3005
IC3002
IN
IN
Vref
OUT
OUT
CN3003
LDM 2
LDM 1
CN2
5 5 LOADING MOTOR
M
LSB 15
LSC 14
LSA 16
CN3004
LSB
LSC
LSA
TO ROTARY ENCODER
REC SF 4
CN3005
TO REC SAFETY
REC SAFETY
S.SENS 19
E.SENS 20
TU FG 22
SP FG 23
CAP REV(L) 67
START SENS Q3001
END SENS Q3002
TU REEL SENS PS3002
SUP REEL SENS PS3001
CAP MDA
M
CN3001
CAP REV(L)
CAP CTL V
CAP FG
IC3001
71 D.FF
67 CTL CLOCK
OSC1 10
OSC2 11
CF3001
MAIN CLK
(10M Hz)
X2 7
X1 8
X3001
TIMER CLK
(32kHz)
C3018
TIMER CLOCK
IC3003
AL5.8V
RESET
12 RESET
5
4
3
2
1
A
B
C
D
E
F
G
H

4.17 VIDEO BLOCK DIAGRAM



0 3 MAIN (VIDEO/ON SCREEN/TERMINAL)
TO SYSCON
VIDEO ENV
I2C DATA
I2C CLK
V.P CTL
V.SYNC
OSD CS
OSD CLK
OSD DATA
TO SERVO
D.FF
V.PULSE
C.SYNC/VREF
TO/FROM TUNER
VIDEO OSD OUT
J7162
V.OUT
J7161
REAR IN
VIDEO
Q7161
BUF
Q203
BUF
Q26
BUF
Q38
Q39
IC201
CS
SCLK
DATAin
Vin
Vout
X tal in
L202, C201
FILTER
C43
FILTER
CLOCK DRIVER
MODE CTL
C-CCD
Y-CCD
APT CTL
Video AGC
ATT (-10dB)
NOT USED
2 8
SW/DISPLAY
J7191
FRONT IN
VIDEO
CN7191
FRONT VIDEO
CN7162
6dB AMP
C.SOUELH
CLEAR SYNC
WHITE LIMITER
SOUELH
Feed Back Clamp
Video ALC
CCD CTL
CCD LPF
C.K
N→P
B.D
Sync.Sep.
Pulse Gen.
VCA
LEVEL Det1
LEVEL Det2
CLPF
Serial Cont Interface
2fsc VCO
fH LOCK CTL
CR Det 2fsc
X-tal VCO/OSC
Clock
Color Killer ID Det.
PB APC
REC APC
REC AFC
PB/REC Discri
APC SW
ACC Det
1/2 Phase SW
DOWN Conv.
1/2 2FL VCO
4Phase Gen.
TANC
ME SECAM DET
Delay
DL
B.E
MIX LEVEL ADJ
Main Conv2
Main Conv1
BPF
TRAP
TRAP OFF
CTL TRAP fH HPF
ACC
2M LPF
HPF
SEP COMP
LPF
L-SECAM
REC MUTE
YCA
G EQ
SQPB
SQPB DL
P EQ
FM AGC
DET
629 TRAP
Edge Delay
DO Det
DLIM
DeMOD
Sub LPF
Main De.Emph
REC AGC Det
PB ALC
D.E.
N.C.
N.L. De.Emph
N.L. Emph
FBC/ALC
YNR
Clamp
Y.LPF
Main Emph Carrier Offset W.C/D.C
fo/Dev Adj
S-DET
FM MOD
1MHPF
7MHPF
lagLead LPF
Head SW1
Head SW2
D FF CTL
HPF
ENV DET
SP2
SP1
EP2
EP1
CH2
CH1
SP
EP
IC1
AUDIO SECTION
REC EQ
EP ON
SW1
REC ON
REC AMP
SW2
SP ON
MUTE CTL
NOT USED
TP111 D. FF
TP106 PB FM
Q152
BUF
X2
X1
NOT USED
CN1
U. DRUM
VIDEO HEAD
SP CH2
SP CH1
LP CH2
LP CH1
5
4
3
2
1
A
B
C
D
E
F
G
H

4.18 AUDIO BLOCK DIAGRAM


0 3 MAIN (FMA/N. AUDIO)
IC2201
TO TUNER
TU AUDIO
RF AUDIO
NC
34
35
32
33
41
37
43
45
44
46
38
47
48
6
4
5
7
INPUT SELECT (R-CH)
NOISE REDUCTION
PRE EMP
DE EMP
MOD
DE MOD
MIX
15
EVR /AGC
MIX
BPF
LIM
19
BPF
NORMAL
R CH
L CH
OUTPUT SELECT
NORMAL INPUT SELECT
EVR /AGC
LOG
LOG
DE MOD
MOD
NOISE REDUCTION
DE EMP
PRE EMP
INPUT SELECT (L-CH)
N DET
A FF
18
DATA
17
CLK
16
A MUTE
23
20
J7161
REAR IN
AUDIO (R)
AUDIO (L)
J7162
REAR OUT
AUDIO (R)
AUDIO (L)
TO SYSCON
IND (R)
IND (L)
TP2253
A.PB FM
IC2251
1
14
13
PRE
PRE
AGC
REC AMP
DET
5
3
7
CN1
9
10
11
TO AUDIO HEAD
CH1
CH2
A.FF
I2C DATA
I2C CLK
A ENV/ND(L)
TO SYSCON
A.MUTE(H)
N.REC ST(H)
N.REC(H)
NOT USED
11
9
8
7
99
IC1
MUTE CTL
DET
VCA
R
P
SP OFF
PRE AMP
REC ON
EP ON
100
1
2
3
4
R2003-R2005
C2003,C2004
FILTER
R2007,C2009
FILTER
REC EQ
Q2052-Q2055
POWER SW
OSC
Q2051
TRANS
T2051
5
6
TP2033
A.ERASE
CN2002
2
1
TO FE HEAD
FE HEAD
CN2001
4
3
2
1
TO A/C HEAD
AE HEAD
REC/PB
2 8
SW/DISPLAY
J7193
FRONT IN
AUDIO (R)
J7192
FRONT IN
AUDIO (L)
CN7191
3
5
F.AUDIO (R)
F.AUDIO (L)
CN7162
3
1
5
4
3
2
1
A
B
C
D
E
F
G
H

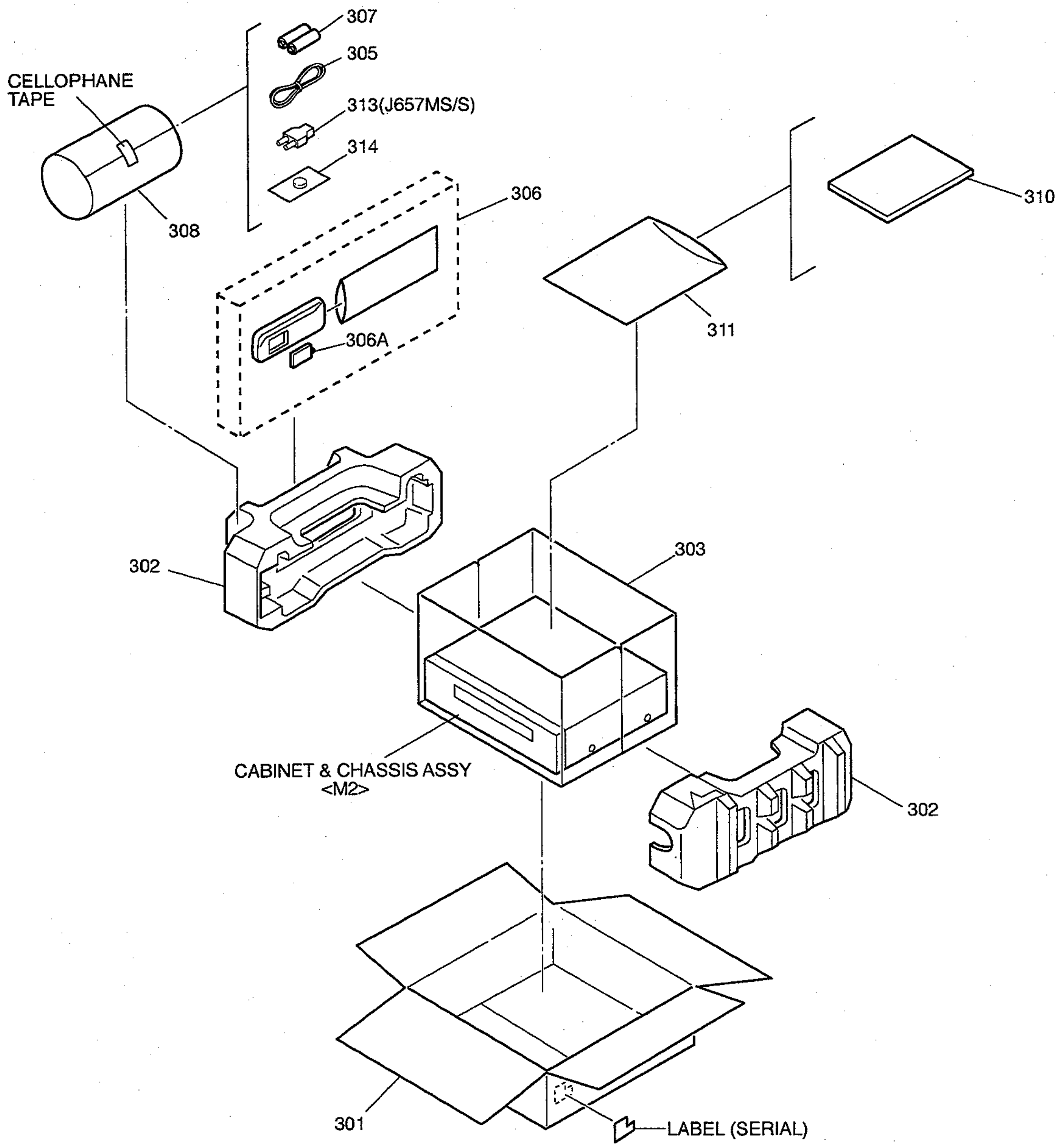
SECTION 5
PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

5.1 PACKING AND ACCESSORY ASSEMBLY <M1>

The instruction manual to be provided with this product will differ according to the destination.


307
305
CELLOPHANE TAPE
313(J657MS/S)
314
306
310
308
306A
311
302
303
CABINET & CHASSIS ASSY <M2>
302
301
LABEL (SERIAL)

****

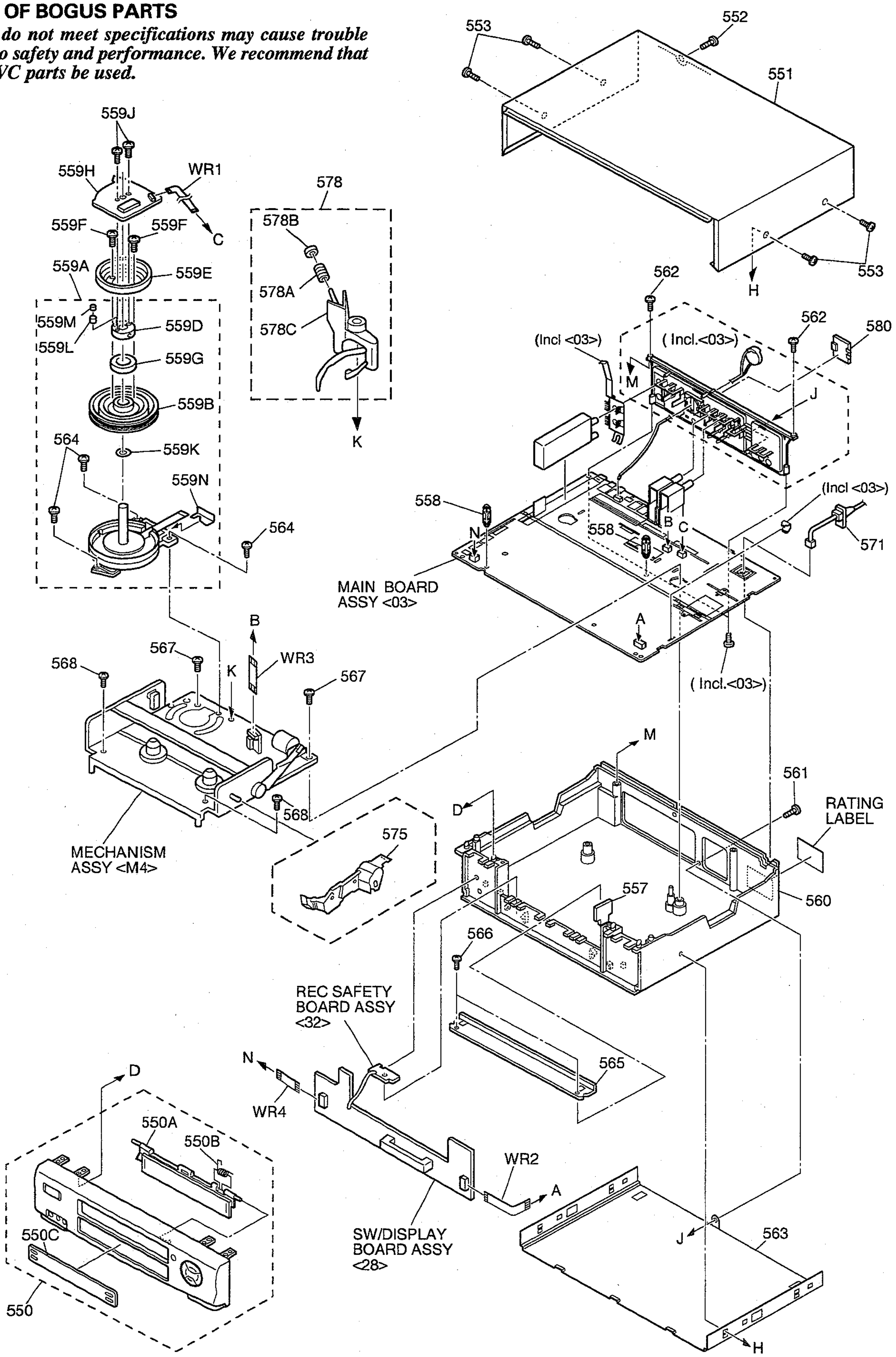
PACKING AND ACCESSORY ASSEMBLY <M1>

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	301	LP30423-035A	PACKING CASE
	302	LP30424-001D	CUSHION ASSY
	303	PQM30021-93	POLY BAG
	305	PU59168-7	RF CABLE
	306	LP20337-008A	REMOTE CONTROLLER
	306A	LP40254-002B	COVER(BATTERY)
	307	–	BATTERY(R6P TYPE)
	308	QPC02202215P	POLY BAG
⚠	310	LPT0109-001A	INST.BOOK(EN.CH)
⚠		LPT0109-002A	INST.BOOK(RU.AR)
	311	QPC02503515P	POLY BAG
⚠	313	PEMC1012	CONVERSION PLUG.J657MS/S
⚠	314	PECA0903	LI BATTERY

5.2 CABINET AND CHASSIS ASSEMBLY <M2>

BEWARE OF BOGUS PARTS

Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.


553
552
551
553
H
562
562
580
(Incl <03>)
(Incl.<03>)
M
J
559J
559H
WR1
559F
559F
C
559A
559E
559M
559L
559D
559G
559B
564
559K
559N
564
578
578B
578A
578C
K
558
N
558
B
C
(Incl <03>)
571
MAIN BOARD
ASSY <03>
A
(Incl.<03>)
568
567
K
B
WR3
567
568
M
561
RATING
LABEL
D
575
MECHANISM
ASSY <M4>
557
560
566
REC SAFETY
BOARD ASSY
<32>
N
WR4
565
D
550A
550B
WR2
A
550C
550
SW/DISPLAY
BOARD ASSY
<28>
J
563
H

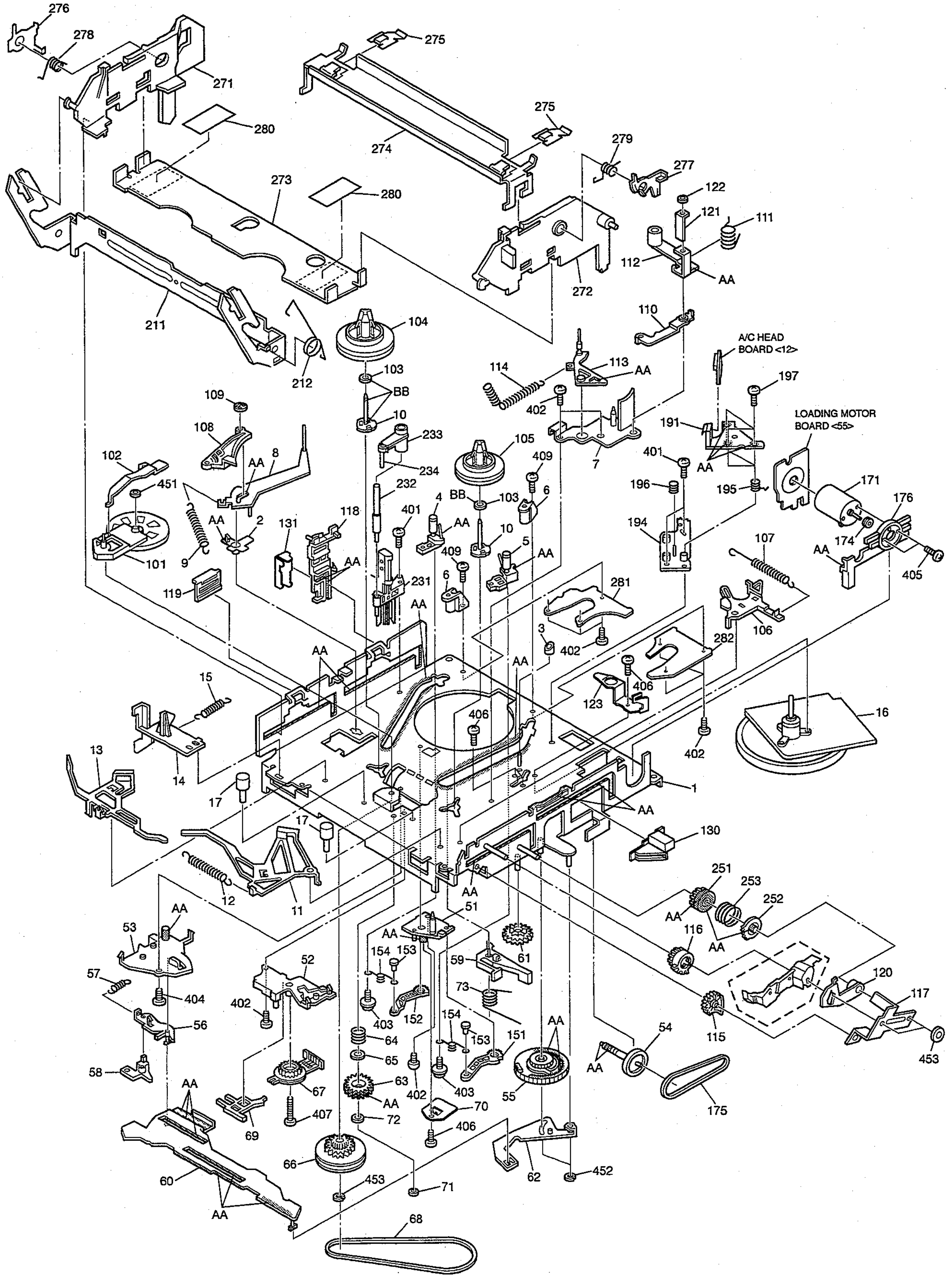
****

CABINET AND CHASSIS ASSEMBLY <M2>

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION
⚠	550	LP10125-014E	FRONT PANEL ASSY,J657MS
		LP10125-019D	FRONT PANEL ASSY,J657MS/S
	550A	LP20342-016B	CASSETTE DOOR
	550B	PQ46448	TORSION SPRING
	550C	LP20343-016A	DISPLAY WINDOW
⚠	551	PQ11676-51	TOP COVER
	552	QYTDSF3010M	SCREW,TOP COVER(REAR)
	553	QYTDSF3010M	SCREW,X4 TOP COVER(SIDE)
	557	LP40441-001A	SPACER(MECHA)
	558	LP40226-001A	PC SUPPORT,X2
	559A	LP20289-002A	DRUM SUB ASSY
	559B	LP20030-002A	UPPER DRUM ASSY
	559D	LP40028-001A	COLLAR ASSY
	559E	PDZ0179	ROTOR ASSY
	559F	QYSPSP3006Z	SCREW,X2
	559G	PDM4439	CAP
	559H	PDZ0181-1-2	STATOR ASSY
	559J	QYSPSP2606Z	SCREW,X2
	559K	PDM4444-19-2	WASHER
	559L	LP40323-001A	CONTACT
	559M	LP30004-005A	COMPRESS.SPRING
	559N	LP40174-001B	FPC PLATE
⚠	560	LP10116-003C	BOTTOM CHASSIS
	561	QYTDSF3010M	SCREW,TERMINAL
	562	QYTDSF3010Z	SCREW,X2 TERMINAL
⚠	563	PQ11668-2-10	BOTTOM COVER
	564	QYTPST2608Z	SCREW,X3 DRUM
	565	LP30312-001B	BRACKET(CHASSIS)
	566	QYTDSF3010Z	SCREW,X2 BRACKET(CHASSIS)
	567	QYTDSF4012Z	SCREW,X2 MECHA
	568	QYTDSF3010Z	SCREW,X2 MECHA
⚠	571	QMP4A10-170	POWER CORD,J657MS
⚠		QMP73J0-170	POWER CORD,657MS/S
	575	LP20324-002B	DOOR OPENER
	578	LP40369-001B	CLEANER ASSY
	578A	PQ46418-1-2	CLEANER ROLLER
	578B	PQ46419-1-2	CLEANER
	578C	LP30407-001B	CLEANER ARM
	580	LP30336-001A	CAP,LT BATTERY
	WR1	QUQ212-0420CG	FFC WIRE,DRUM
	WR2	QUQ112-1214CG	FFC WIRE,DISPLAY
	WR3	WJT0005-002A	E-CARD WIRE,A/C HEAD
	WR4	QUQ212-0514CG	FFC WIRE,DISPLAY

⚠ REF No. PART No. PART NAME, DESCRIPTION

5.3 MECHANISM ASSEMBLY <M4>


276
278
271
275
280
274
275
279
277
122
121
111
112
AA
273
280
272
211
212
104
110
A/C HEAD BOARD <12>
103
BB
114
113
AA
197
109
10
402
7
191
LOADING MOTOR BOARD <55>
108
233
105
401
AA
102
AA
8
234
409
451
232
BB
103
6
196
195
171
176
AA
2
131
118
401
4
AA
10
194
107
174
AA
101
9
409
5
AA
405
119
6
231
AA
281
106
3
402
282
AA
AA
15
406
123
406
16
402
1
13
14
17
17
AA
130
12
11
AA
51
251
253
252
AA
53
AA
116
AA
154
153
59
61
120
57
52
73
117
404
402
403
152
154
153
151
AA
54
115
453
56
64
65
63
AA
402
403
70
55
AA
58
67
AA
407
72
69
406
175
66
453
71
62
452
60
AA
68

Classification	Part No.	Symbol in drawing
Grease	KYODO-SH-P	AA
Oil	COSMO-HV56	BB

NOTE: The section marked in AA and BB indicate lubrication and greasing areas.

****

MECHANISM ASSEMBLY <M4>

# ⚠ REF No.	PART No.	PART NAME, DESCRIPTION
1	LP20228-003D	MAIN DECK ASSY
2	LP30232-002A	T.ARM BEARING
3	LP40097-001B	G.POLE CAP
4	LP40101-002A	P.BASE ASSY(S)
5	LP40104-002A	P.BASE ASSY(T)
6	LP30409-002A	UV CATCHER 2,X2
7	LP20234-001C	LID GUIDE
8	LP40108-001A	TENSION ARM ASSY
9	LP30003-010A	TENSION SPRING
10	LP40123-001A	REEL SHAFT,X2
11	LP40111-002B	MAIN BRAKE AY (TAKE-UP)
12	LP30003-002A	TENSION SPRING
13	LP40110-002D	MAIN BRAKE ASSY (SUPPLY)
14	LP30245-001C	REC SAFTY LEVER
15	LP30003-004A	TENSION SPRING
16	QAR0032-003	CAPSTAN MOTOR
17	PQ46302-1-3	ADJUST PIN,X2
51	LP30223-003B	L.A.GEAR SHAFT
52	LP20233-003B	R.ENCODER GUIDE
53	LP30226-003B	CTL.PLATE GUIDE
54	LP40120-001A	WORM GEAR
55	LP30229-001B	CTL.CAM
56	LP30249-003B	T.UP LEVER
57	LP30003-006A	TENSION SPRING
58	LP40119-002A	T.UP HEAD
59	LP40113-001A	C.BRAKE ASSY
60	LP10080-002E	CTL.PLATE
61	LP30237-002A	CASSETTE GEAR
62	LP40107-002A	LINK LEVER ASSY
63	LP40122-001A	DIRECT GEAR
64	LP40224-001C	COMPRESSION SPRING
65	LP30017-002A	SPACER,D.GEAR
66	LP40115-002C	CLUTCH UNIT
67	QSW0554-002	ROTARY ENCODER
68	LP30005-005A	BELT,CAP.MOTOR
69	LP30235-002A	CHANGE LEVER
70	LP40379-001A	CTL BRACKET(1)
71	LP30016-001A	SLIT WASHER
72	LP30017-009A	SPACER,D.GEAR
73	LP40355-002A	TORSION SPRING
101	LP40114-002D	IDLER ARM ASSY
102	LP30236-002A	IDLER LEVER
103	LP30017-004A	SPACER,REEL DISK
104	LP20237-001B	REEL DISK (SUPPLY)
105	LP20238-001B	REEL DISK (TAKE-UP)
106	LP40112-001D	S.BRAKE(T)ASSY
107	LP40357-001B	TENSION SPRING
108	LP40109-002C	T.BRAKE ASSY
109	PQ46302-1-3	ADJUST PIN
110	LP40149-001B	P.LEVER ASSY
111	LP40148-001A	TORSION SPRING
112	LP40105-001A	P.R.ARM ASSY
113	LP40106-001B	GUIDE ARM ASSY
114	LP40134-001B	TENSION SPRING
115	LP30243-001B	DRIVE GEAR
116	LP30242-001A	RELAY GEAR
117	LP40214-001A	C.H.BRACKET
118	LP30244-001D	GUIDE RAIL
119	LP40118-001A	RAIL CAP
120	LP30339-001A	OPENER GUIDE
121	LP40382-001A	P.R. SHEET
122	LP30016-002A	SLIT WASHER
123	LP30482-001A	P.ROLLER GUIDE
130	LP30493-001A	START SENSOR CAP
131	LP40457-001A	END SENSOR SHEET2
151	LP40103-002A	L.ARM GEAR(T)
152	LP30224-001A	L.ARM GEAR(S)
153	LP40100-001A	PIN,L.ARM GEAR(S)
	LP40100-001A	PIN,L.ARM GEAR(T)
154	LP40099-001A	TORSION ARM,L.ARM GEAR(S)
	LP40099-001A	TORSION ARM,L.ARM.GEAR(T)
171	QAR0023-001	LOADING MOTOR
174	PQ43546-1-2	MOTOR PULLEY
175	LP30005-003A	BELT,LOADING MOTOR
176	LP30230-001B	MOTOR GUIDE
191	QAH0010-002	AC HEAD
194	LP30228-001A	HEAD BASE
195	LP30004-012A	COMPRES.SPRING X3
196	LP40236-001A	COMPRESSION SPRING
197	LP40213-002B	SPECIAL SCREW,X3
211	LP20240-001B	DRIVE ARM
212	LP40137-001A	TORSION SPRING
231	NAH0001-001	FULL ERASE HEAD
232	LP40098-001B	GUIDE POLE(S)
233	LP30459-001A	T.STUD BASE
234	LP40367-001A	TENSION STUD
251	LP30239-002E	LIMIT GEAR(1)
252	LP30240-002C	LIMIT GEAR(2)
253	LP40136-001D	TORSION SPRING
271	LP10081-001C	SIDE HOLDER(L)
272	LP40403-001B	S.HOLDER(R)ASSY
273	LP30257-001C	CASSETTE HOLDER
274	LP20241-001C	TOP PLATE
275	LP30258-001B	SPRING PLATE,X2
276	LP30255-001F	LOCK LEVER(L)
277	LP30256-001D	LOCK LEVER(R)
278	LP40168-001A	TOR.SPRING(L)
279	LP40218-001B	TOR.SPRING(R)
280	LP30019-006C	PAD,X2
281	LP40275-001A	PLATE(S)
282	LP40276-001A	PLATE(T)
401	QYTDST2608Z	SCREW,FE.HEAD
	QYTDST2608Z	SCREW,X2 HEAD BASE
402	QYTDST2606Z	SCREW,X6 PLATE(S)(T)
	QYTDST2606Z	SCREW,L.A.GEAR
	QYTDST2606Z	SCREW,R.ENCODER GUIDE
	QYTDST2606Z	SCREW,X2 LID GUIDE
403	QYSPSTG2606Z	SCREW,POLE BASE(S)
	QYSPSTG2606Z	SCREW,P.BASE(T)
404	QYTPST2605Z	SCREW,CTL.PLATE GUIDE
405	QYTPSP3003Z	SCREW,X2 LOADING MOTOR
406	QYTDSF2608M	SCREW,CTL BRACKET(1)
	QYTDSF2608M	SCREW,X3 CAP.MOTOR
407	QYTPST2620Z	SCREW,R.ENCODER
409	QYTPST2606Z	SCREW,X2 UV CATCHER
451	LP30016-001A	SLIT WASHER,IDLER ARM
452	PQM30017-24	SLIT WASHER,CTL.CAM
	PQM30017-24	SLIT WASHER,LINK LEVER
453	PQM30017-47	SLIT WASHER,CLUTCH GEAR
	PQM30017-47	SLIT WASHER,X2 C.H.BRACKET

5.4 ELECTRICAL PARTS LIST

****

MAIN BOARD ASSEMBLY <03>

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	PW1	LPA10014-12B	MAIN BOARD ASSY
	IC1	JCP8016-MSA	IC
		or JCP8016-MSB	IC
	IC201	LC74789N-9718	IC (OSD)
	IC2201	AN3665FB-A	IC
⚠	IC2251	AN3328S	IC
	IC3001	HD6433928TB21F	QFP IC (MCU)
	IC3002	TA7291S	IC
	IC3003	S-80728AN-DR-X	IC
	IC3004	M24C08-BN6	IC
		or X24C08P	IC
		or AT24C08-10PC	IC
		or 24LC08B/P	IC
	IC3301	HD6433926TB28F	QFP IC (MCU)
	IC4001	BU2885CS	IC
	Q26	2SD1819A/QRS/-X	TRANSISTOR
		or 2SC4081/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q38	2SC4081/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q39	2SA1576A/QR/-X	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
	Q152	2SB1218A/QR/-X	TRANSISTOR
		or 2SA1576A/QRS/-X	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
	Q203	2SD1819A/QRS/-X	TRANSISTOR
		or 2SC4081/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q2001	2SC4081/QRS/-X	TRANSISTOR
		or 2SD1819A/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q2002	2SC4081/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SD1819A/QRS/-X	TRANSISTOR
	Q2003	DTA144WU	TRANSISTOR
		or RN2309	TRANSISTOR
		or UN511E	TRANSISTOR
	Q2051	2SC4081/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SD1819A/QRS/-X	TRANSISTOR
	Q2052	2SA1576A/QR/-X	TRANSISTOR
		or 2SB1218A/QR/-X	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
	Q2053	DTC144WU	TRANSISTOR
		or RN1309	TRANSISTOR
		or UN521E	TRANSISTOR
	Q2054	2SA1576A/QR/-X	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
		or 2SB1218A/QR/-X	TRANSISTOR
	Q2055	DTC144WU	TRANSISTOR
		or RN1309	TRANSISTOR
		or UN521E	TRANSISTOR
	Q2251	DTA144WU	TRANSISTOR
		or RN2309	TRANSISTOR
		or UN511E	TRANSISTOR
	Q2254	DTC114EU	TRANSISTOR
		or RN1302	TRANSISTOR
		or UN5211	TRANSISTOR
	Q2255	DTA144WU	TRANSISTOR
		or RN2309	TRANSISTOR
		or UN511E	TRANSISTOR
	Q3001	PTZ-NV16	PHOTO TRANSISTOR
		or PTZ-NV09	PHOTO TRANSISTOR
	Q3002	PTZ-NV16	PHOTO TRANSISTOR
		or PTZ-NV09	PHOTO TRANSISTOR
	Q3003	2SD1819A/QRS/-X	TRANSISTOR
		or 2SC4081/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q3005	2SD1819A/QRS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SC4081/QRS/-X	TRANSISTOR
	Q4201	2SC4081/RS/-X	TRANSISTOR
	Q5101	2SK2632-CB14	POWER MOS FET
		or 2SK2666F04	FE TRANSISTOR
		or 2SK2129-LT	POWER MOS FET
	Q5102	2SD2144S/UV/-T	TRANSISTOR
	Q5304	UN5211	TRANSISTOR
		or DTC114EU	TRANSISTOR
		or RN1302	TRANSISTOR
	Q5305	2SC1740S/RS/-T	TRANSISTOR
		or 2SC3199/YG/-T	TRANSISTOR
	Q5306	2SD2144S/UVW/-T	TRANSISTOR
	Q5315	2SD2061/F/	TRANSISTOR
	Q5316	2SD1819A/RS/-X	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SC4081/RS/-X	TRANSISTOR
	Q5319	2SC3616/ML/-T	TRANSISTOR
	Q5320	UN5111	TRANSISTOR
		or RN2302	TRANSISTOR
		or DTA114EU	TRANSISTOR
	Q5451	2SB927/ST/-T	TRANSISTOR
	Q5452	DTC144EU	TRANSISTOR
	Q6033	UN5211	TRANSISTOR
		or RN1302	TRANSISTOR
		or DTC114EU	TRANSISTOR
	Q6035	UN5211	TRANSISTOR
		or DTC114EU	TRANSISTOR
		or RN1302	TRANSISTOR
	Q7162	2SB1218A/QR/-X	TRANSISTOR
		or 2SA1576A/QR/-X	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
	D201	1N4148M	DIODE
		or 1SS133	DIODE
	D202	1N4148M	DIODE
		or 1SS133	DIODE
	D2001	1N4148M	DIODE
		or 1SS133	DIODE
	D2201	11ES2	DIODE
	D2253	DAP202U	DIODE
	D3001	LNB2301L01VI	LE DIODE
	D3002	11ES2	DIODE
	D3003	11ES2	DIODE
⚠	D3004	RB721Q	DIODE
	D3005	RD39ES/B3/-T2	ZENER DIODE
		or UZ39BSC	ZENER DIODE
		or MTZJ39C	ZENER DIODE
	D3007	1SS133	DIODE
		or 1N4148M	DIODE

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	D3008	1SS133	DIODE	
		or 1N4148M	DIODE	
	D3009	1SS133	DIODE	
		or 1N4148M	DIODE	
	D5001	S1WB(A)60F4102	BRIDGE DIODE	
		or S1WB(A)60F4072X	BRIDGE DIODE	
		or S1WB(A)60F4062X	BRIDGE DIODE	
	D5101	AU01	FR DIODE	
		or ERA18-04-T2	FR DIODE	
		or PG104RS	FR DIODE	
		or 10ELS4	FR DIODE	
		or 1SR153-400-T2	FR DIODE	
	D5102	AU01	FR DIODE	
		or ERA18-04-T2	FR DIODE	
		or PG104RS	FR DIODE	
		or 1SR153-400-T2	FR DIODE	
		or 10ELS4	FR DIODE	
	D5103	1N4148M	DIODE	
		or 1SS133	DIODE	
	D5201	ERA18-02-T2	FR DIODE	
		or 1SR153-400-T2	FR DIODE	
	D5202	FML-12S	FR DIODE	
		or FCF06A20	FR DIODE	
		or MA644	FR DIODE	
		or YG901C2	FR DIODE	
	D5206	FMB-24	BARRIER DIODE	
		or F5KQ40B	BARRIER DIODE	
		or MA7D49	SB DIODE	
		or YG801C04	SB DIODE	
	D5210	AU01Z	FR DIODE	
		or PG104RS	FR DIODE	
		or 10ELS2	FR DIODE	
		or ERA18-02-T2	FR DIODE	
		or 1SR153-400-T2	FR DIODE	
	D5211	AU01Z	FR DIODE	
		or ERA18-02-T2	FR DIODE	
		or 1SR153-400-T2	FR DIODE	
		or 10ELS2	FR DIODE	
		or PG104RS	FR DIODE	
	D5301	UZ15BSA	ZENER DIODE	
		or RD15ES/B1/-T2	ZENER DIODE	
		or MTZJ15A	ZENER DIODE	
	D5304	1N4148M	DIODE	
		or 1SS133	DIODE	
	D5305	UZ30BSA	ZENER DIODE	
		or RD30ES/B1/-T2	ZENER DIODE	
		or MTZJ30A	ZENER DIODE	
	D5307	UZ6.2BSC	ZENER DIODE	
		or MTZJ6.2C	ZENER DIODE	
		or RD6.2ES/B3/-T2	ZENER DIODE	
	D5311	RD5.1JS/B2/-T2	ZENER DIODE	
		or MA4051N/M/-T2	ZENER DIODE	
	D5312	1N4148M	DIODE	
		or 1SS133	DIODE	
	D5351	11E2-T5	DIODE	
	D5352	11E2-T5	DIODE	
	D5353	11E2-T5	DIODE	
	D5354	11E2-T5	DIODE	
	D6002	HZ30-2L-T2	ZENER DIODE	
		or HZ30-2LTD	Z DIODE (M)	
	R1	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R2	NRSA02J-561X	MG RESISTOR	560Ω,1/10W
	R3	NRSA02J-273X	MG RESISTOR	27kΩ,1/10W
	R7	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R9	NRSA02J-333X	MG RESISTOR	33kΩ,1/10W
	R13	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R14	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R15	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R16	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R17	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R18	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R19	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R23	NRSA02J-822X	MG RESISTOR	8.2kΩ,1/10W
	R24	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
	R25	NRSA02J-152X	MG RESISTOR	1.5kΩ,1/10W
	R52	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R56	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R57	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R60	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
	R61	NRSA02J-153X	MG RESISTOR	15kΩ,1/10W
	R62	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R68	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R69	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R73	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R95	NRSA02J-104X	MG RESISTOR	100kΩ,1/10W
	R96	NRSA02J-154X	MG RESISTOR	150kΩ,1/10W
	R97	NRSA02J-104X	MG RESISTOR	100kΩ,1/10W
	R98	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R99	NRSA02J-104X	MG RESISTOR	100kΩ,1/10W
	R120	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R121	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R122	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
	R123	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R124	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R133	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R138	NRSA02J-392X	MG RESISTOR	3.9kΩ,1/10W
	R143	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R150	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R201	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R204	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R205	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R206	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R208	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R211	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R213	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
	R226	NRSA02J-182X	MG RESISTOR	1.8kΩ,1/10W
	R2001	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R2002	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R2003	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
	R2004	NRSA02J-224X	MG RESISTOR	220kΩ,1/10W
	R2005	NRSA02J-121X	MG RESISTOR	120Ω,1/10W
	R2006	NRSA02J-273X	MG RESISTOR	27kΩ,1/10W
	R2007	NRSA02J-223X	MG RESISTOR	22kΩ,1/10W
	R2013	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
	R2016	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R2018	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R2019	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R2053	NRSA02J-822X	MG RESISTOR	8.2kΩ,1/10W
	R2054	NRSA02J-123X	MG RESISTOR	12kΩ,1/10W
	R2055	NRSA02J-3R3X	MG RESISTOR	3.3Ω,1/10W
	R2056	QRE141J-820Y	RESISTOR	82Ω,1/4W
	R2057	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R2058	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
	R2059	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R2060	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
	R2202	NRSA02J-333X	MG RESISTOR	33kΩ,1/10W
	R2203	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R2205	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R2206	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R2207	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
	R2209	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
	R2210	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R2211	NRSA02J-511X	MG RESISTOR	510Ω,1/10W
	R2212	NCB21EK-683X	CAPACITOR	0.068μF,25V
	R2213	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R2214	NRSA02J-511X	MG RESISTOR	510Ω,1/10W
	R2215	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
	R2217	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
	R2218	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R2219	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R2221	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R2222	NRSA02J-333X	MG RESISTOR	33kΩ,1/10W
	R2223	NRSA02J-182X	MG RESISTOR	1.8kΩ,1/10W
	R2224	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R2225	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
	R2226	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R2228	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
	R2229	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
	R2233	NRSA02J-203X	MG RESISTOR	20kΩ,1/10W
	R2234	NRSA02J-333X	MG RESISTOR	33kΩ,1/10W
	R2251	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
	R2253	NRSA02J-270X	MG RESISTOR	27Ω,1/10W
	R2254	NRSA02J-220X	MG RESISTOR	22Ω,1/10W
	R2256	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R2258	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
	R2259	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R2713	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R2714	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3001	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3002	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3003	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3004	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3010	NRSA02J-105X	MG RESISTOR	1MΩ,1/10W
	R3014	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3015	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3016	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3017	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3019	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3020	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3021	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3022	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3023	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3024	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3025	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
	R3031	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3032	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3033	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3034	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3035	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3036	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3037	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3038	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3039	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R3040	NRSA02J-152X	MG RESISTOR	1.5kΩ,1/10W
	R3041	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3042	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3043	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3044	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3045	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3046	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3047	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3048	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3049	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3050	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3051	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3052	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3053	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3054	NRSA02J-272X	MG RESISTOR	2.7kΩ,1/10W
	R3055	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3056	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3057	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R3058	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3059	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R3060	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3061	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3062	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3064	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3067	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3068	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3069	NRSA02J-271X	MG RESISTOR	270Ω,1/10W
	R3070	NRSA02J-271X	MG RESISTOR	270Ω,1/10W
	R3071	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3073	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3074	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3075	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3076	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3077	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3078	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3079	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3080	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
	R3201	NRSA02J-104X	MG RESISTOR	100kΩ,1/10W
	R3203	NRSA02J-562X	MG RESISTOR	5.6kΩ,1/10W
	R3204	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R3205	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3206	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3207	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3209	QRE141J-181Y	RESISTOR	180Ω,1/4W
	R3210	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
	R3211	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
	R3212	NRSA02J-181X	MG RESISTOR	180Ω,1/10W
	R3213	NRSA02J-273X	MG RESISTOR	27kΩ,1/10W
	R3214	NRSA02J-181X	MG RESISTOR	180Ω,1/10W
	R3215	NRSA02J-273X	MG RESISTOR	27kΩ,1/10W
	R3220	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
⚠	R3222	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3223	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3224	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3225	NRSA02J-104X	MG RESISTOR	100kΩ,1/10W
	R3226	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3227	NRSA02J-393X	MG RESISTOR	39kΩ,1/10W
	R3228	NRSA02J-474X	MG RESISTOR	470kΩ,1/10W
	R3229	NRSA02J-334X	MG RESISTOR	330kΩ,1/10W
	R3230	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3231	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R3232	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3233	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3234	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3235	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
	R3236	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
	R3237	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3238	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3239	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3240	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R3241	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R3242	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R3243	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3244	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3246	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3249	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3250	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3253	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3254	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3255	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3256	NRSA02J-391X	MG RESISTOR	390Ω,1/10W
	R3257	NRSA02J-391X	MG RESISTOR	390Ω,1/10W
	R3301	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3302	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3303	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3304	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3310	NRSA02J-105X	MG RESISTOR	1MΩ,1/10W
	R3314	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3315	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3316	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3317	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R3318	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3319	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3320	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3321	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R3322	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3323	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3324	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3325	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3326	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
	R3327	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
	R3331	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3343	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3344	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3345	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3346	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3347	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3348	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3352	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3357	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3358	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3359	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3360	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3361	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3362	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3365	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3366	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R3367	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3368	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3369	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3370	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R3371	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3373	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3374	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R3375	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R3376	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3378	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3380	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
	R3501	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3502	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3503	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3504	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3505	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3506	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3507	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3508	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3509	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R3510	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R4001	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R4003	NRSA02J-122X	MG RESISTOR	1.2kΩ,1/10W
	R4005	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R4007	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R4008	NRSA02J-562X	MG RESISTOR	5.6kΩ,1/10W
	R4009	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
	R4011	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R4012	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R4013	NRSA02J-562X	MG RESISTOR	5.6kΩ,1/10W
	R4014	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	R4015	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R4201	NRSA02J-104X	MG RESISTOR	100kΩ,1/10W
	R4202	NRSA02J-223X	MG RESISTOR	22kΩ,1/10W
	R4203	NRSA02J-563X	MG RESISTOR	56kΩ,1/10W
	R5101	QRE141J-224Y	RESISTOR	220kΩ,1/4W
	R5102	QRE141J-224Y	RESISTOR	220kΩ,1/4W
	R5103	QRE141J-683Y	RESISTOR	68kΩ,1/4W
	R5104	QRG029J-154G	OMF RESISTOR	150kΩ,2W
	R5106	QRT01DJ-R39X	MF RESISTOR	0.39Ω,1W
	R5107	QRE121J-331Y	RESISTOR	330Ω,1/2W
	R5108	NRSA02J-152X	MG RESISTOR	1.5kΩ,1/10W
	R5109	NRSA02J-681X	MG RESISTOR	680Ω,1/10W
	R5110	NRSA02J-224X	MG RESISTOR	220kΩ,1/10W
	R5111	NRSA02J-821X	MG RESISTOR	820Ω,1/10W
	R5301	NRSA02J-3R3X	MG RESISTOR	3.3Ω,1/10W
	R5302	NRSA02J-3R3X	MG RESISTOR	3.3Ω,1/10W
	R5303	NRSA02J-3R3X	MG RESISTOR	3.3Ω,1/10W
	R5304	NRSA02J-3R9X	MG RESISTOR	3.9Ω,1/10W
	R5307	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R5312	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R5313	NRSA02J-122X	MG RESISTOR	1.2kΩ,1/10W
⚠	R5314	QRZ9005-101X	FUSI RESISTOR	10Ω,1/4W
	R5315	NRSA02J-122X	MG RESISTOR	1.2kΩ,1/10W
	R5316	QRA14CF-2211Y	CMF RESISTOR	2.21kΩ,1/4W
	R5317	QRA14CF-3481Y	CMF RESISTOR	3.48kΩ,1/4W
	R5319	QRE141J-511Y	RESISTOR	510Ω,1/4W
	R5320	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R5328	QRE141J-331Y	RESISTOR	330Ω,1/4W
	R5340	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R5341	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R5342	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
	R5343	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
	R5348	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
	R5349	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
	R5451	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W

# ⚠ REF No.	PART No.	PART NAME, DESCRIPTION	
R5452	QRE123J-331X	RESISTOR	330Ω,1/2W
R6020	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
R6021	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
R6022	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
R6023	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
R6032	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
R6033	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
R6035	NRSA02J-105X	MG RESISTOR	1MΩ,1/10W
R6039	NRSA02J-105X	MG RESISTOR	1MΩ,1/10W
R6051	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
R6052	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
R6054	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
R7161	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
R7162	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
R7163	NRSA02J-750X	MG RESISTOR	75Ω,1/10W
R7164	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
R7165	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
R7166	NRSA02J-750X	MG RESISTOR	75Ω,1/10W
R7168	NRSA02J-750X	MG RESISTOR	75Ω,1/10W
R7172	QRE121J-391Y	RESISTOR	390Ω,1/2W
R7174	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
C1	QEKC1CM-106	E CAPACITOR	10µF,16V
C3	NCB21HK-103X	CAPACITOR	0.01µF,50V
C5	NCB21HK-103X	CAPACITOR	0.01µF,50V
C6	NCB11EK-104X	CAPACITOR	0.1µF,25V
C7	QEKC0JM-107	E CAPACITOR	100µF,6.3V
C9	NCB21HK-103X	CAPACITOR	0.01µF,50V
C11	NCB21HK-103X	CAPACITOR	0.01µF,50V
C12	NCB21CK-473X	CAPACITOR	0.047µF,16V
C13	QEKC1HM-335	E CAPACITOR	3.3µF,50V
C14	NCB21EK-333X	CAPACITOR	0.033µF,25V
C16	NCF21CZ-105X	CAPACITOR	1µF,16V
C17	NCB21HK-103X	CAPACITOR	0.01µF,50V
C20	NCF21CZ-225X	CAPACITOR	2.2µF,16V
C21	NCB21EK-104X	CAPACITOR	0.1µF,25V
C23	NCB21HK-223X	CAPACITOR	0.022µF,50V
C24	NCB21CK-474X	CAPACITOR	0.47µF,16V
C25	NCB21EK-104X	CAPACITOR	0.1µF,25V
C29	NBE20JM-475X	T CAPACITOR	4.7µF,6.3V
C30	NBE20JM-475X	T CAPACITOR	4.7µF,6.3V
C31	NCB21HK-223X	CAPACITOR	0.022µF,50V
C32	NCB21HK-103X	CAPACITOR	0.01µF,50V
C34	NCB21EK-104X	CAPACITOR	0.1µF,25V
C35	NCB21HK-103X	CAPACITOR	0.01µF,50V
C37	QEKJ0JM-476	E CAPACITOR	47µF,6.3V
C41	NCB21EK-104X	CAPACITOR	0.1µF,25V
C42	NCB21HK-103X	CAPACITOR	0.01µF,50V
C43	NCB21HK-103X	CAPACITOR	0.01µF,50V
C44	NDC21HJ-101X	CAPACITOR	100pF,50V
C45	NCB21EK-104X	CAPACITOR	0.1µF,25V
C46	NDC21HJ-101X	CAPACITOR	100pF,50V
C47	NCB21EK-104X	CAPACITOR	0.1µF,25V
C48	QEKJ0JM-476	E CAPACITOR	47µF,6.3V
C49	NDC21HJ-331X	CAPACITOR	330pF,50V
C51	QEKJ1HM-105	E CAPACITOR	1µF,50V
C52	QEKJ1HM-105	E CAPACITOR	1µF,50V
C53	QEKJ1HM-105	E CAPACITOR	1µF,50V
C54	QEKJ1HM-225	E CAPACITOR	2.2µF,50V
C55	QEKJ1CM-106	E CAPACITOR	10µF,16V
C56	QEKJ1HM-335	E CAPACITOR	3.3µF,50V
C57	NCB21EK-104X	CAPACITOR	0.1µF,25V
C58	NCB21EK-104X	CAPACITOR	0.1µF,25V
C59	NCB21EK-104X	CAPACITOR	0.1µF,25V
C61	NDC21HJ-390X	CAPACITOR	39pF,50V
C62	NCB21EK-104X	CAPACITOR	0.1µF,25V
C63	NDC21HJ-151X	CAPACITOR	150pF,50V
C64	QEKJ0JM-227	E CAPACITOR	220µF,6.3V
C65	NCB21EK-104X	CAPACITOR	0.1µF,25V
C81	NDC21HJ-150X	CAPACITOR	15pF,50V
C82	NDC21HJ-150X	CAPACITOR	15pF,50V
C83	NDC21HJ-150X	CAPACITOR	15pF,50V
C84	NDC21HJ-150X	CAPACITOR	15pF,50V
C91	NCB21EK-104X	CAPACITOR	0.1µF,25V
C98	NCB21HK-103X	CAPACITOR	0.01µF,50V
C107	NDC21HJ-5R0X	CAPACITOR	5pF,50V
C108	NCB21EK-104X	CAPACITOR	0.1µF,25V
C113	NDC21HJ-471X	CAPACITOR	470pF,50V
C114	NCB21HK-223X	CAPACITOR	0.022µF,50V
C118	NCB21CK-474X	CAPACITOR	0.47µF,16V
C133	NCB21EK-104X	CAPACITOR	0.1µF,25V
C134	NCB21HK-103X	CAPACITOR	0.01µF,50V
C141	NCB21EK-104X	CAPACITOR	0.1µF,25V
C143	QEKJ0JM-476	E CAPACITOR	47µF,6.3V
C164	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
C165	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
C201	NDC21HJ-100X	CAPACITOR	10pF,50V
C203	NDC21HJ-330X	CAPACITOR	33pF,50V
C204	NDC21HJ-330X	CAPACITOR	33pF,50V
C207	NCB21CK-224X	CAPACITOR	0.22µF,16V
C209	NCB21CK-224X	CAPACITOR	0.22µF,16V
C211	QEKJ1HM-105	E CAPACITOR	1µF,50V
C213	QEKJ1HM-105	E CAPACITOR	1µF,50V
C215	QEKJ0JM-227	E CAPACITOR	220µF,6.3V
C258	NDC21HJ-560X	CAPACITOR	56pF,50V
C2002	QEKJ1CM-476	E CAPACITOR	47µF,16V
C2003	NCB21HK-123X	CAPACITOR	0.012µF,50V
C2004	QEKJ1CM-226	E CAPACITOR	22µF,16V
C2005	NCB21HK-102X	CAPACITOR	0.001µF,50V
C2006	NCB21HK-331X	CAPACITOR	330pF,50V
C2007	QEKJ1CM-106	E CAPACITOR	10µF,16V
C2008	NCB21HK-152X	CAPACITOR	0.0015µF,50V
C2009	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
C2010	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
C2013	NCB21EK-333X	CAPACITOR	0.033µF,25V
C2015	QEKJ1CM-226	E CAPACITOR	22µF,16V
C2016	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
C2051	NCB21HK-331X	CAPACITOR	330pF,50V
C2052	QFV61HJ-823	F CAPACITOR	0.082µF,50V
C2053	NCB21HK-472X	CAPACITOR	0.0047µF,50V
C2054	NCB21EK-223X	CAPACITOR	0.022µF,25V
C2055	QEKJ1CM-106	E CAPACITOR	10µF,16V
C2202	QETC1CM-226	E CAPACITOR	22µF,16V
C2207	NCB21CK-473X	CAPACITOR	0.047µF,16V
C2208	QETC1CM-476	E CAPACITOR	47µF,16V
C2209	QETC1HM-225	E CAPACITOR	2.2µF,50V
C2210	QETC1CM-476	E CAPACITOR	47µF,16V
C2211	NCB21HK-153X	CAPACITOR	0.015µF,50V
C2212	NCB21HK-103X	CAPACITOR	0.01µF,50V
C2213	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
C2214	NCB21HK-103X	CAPACITOR	0.01µF,50V
C2216	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
C2217	NCB21HK-103X	CAPACITOR	0.01µF,50V

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	C2218	NCB21HK-153X	CAPACITOR	0.015μF,50V
	C2219	QETC1CM-476	E CAPACITOR	47μF,16V
	C2220	QETC1HM-225	E CAPACITOR	2.2μF,50V
	C2221	NCB21CK-473X	CAPACITOR	0.047μF,16V
	C2222	QEKJ1CM-476	E CAPACITOR	47μF,16V
	C2227	QEKJ1HM-224	E CAPACITOR	0.22μF,50V
	C2228	QEKJ1CM-476	E CAPACITOR	47μF,16V
	C2229	QEKJ1CM-226	E CAPACITOR	22μF,16V
	C2230	QEKJ1CM-106	E CAPACITOR	10μF,16V
	C2231	QETC1HM-106	E CAPACITOR	10μF,50V
	C2232	QETC1HM-106	E CAPACITOR	10μF,50V
	C2233	QEKJ1HM-105	E CAPACITOR	1μF,50V
	C2234	QEKJ1HM-105	E CAPACITOR	1μF,50V
	C2236	QEKJ1CM-476	E CAPACITOR	47μF,16V
	C2239	NCB21EK-104X	CAPACITOR	0.1μF,25V
	C2251	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C2252	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C2253	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C2254	QEKJ1CM-476	E CAPACITOR	47μF,16V
	C2255	NCB21CK-104X	CAPACITOR	0.1μF,16V
	C2256	NDC21HJ-101X	CAPACITOR	100pF,50V
	C2257	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C2258	NCB21HK-223X	CAPACITOR	0.022μF,50V
	C2260	NDC21HJ-221X	CAPACITOR	220pF,50V
	C2261	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C3001	QEKJ1CM-336	E CAPACITOR	33μF,16V
	C3004	QETN0JM-108	E CAPACITOR	1000μF,6.3V
	C3006	NCB21CK-473X	CAPACITOR	0.047μF,16V
	C3012	NDC21HJ-102X	CAPACITOR	0.001μF,50V
	C3015	QEKJ1CM-106	E CAPACITOR	10μF,16V
	C3016	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C3017	NDC21HJ-180X	CAPACITOR	18pF,50V
	C3018	QAT7001-450Z	TRIM CAPACITOR,TIMER CLOCK	
	C3022	NCB21CK-473X	CAPACITOR	0.047μF,16V
	C3025	QEKJ1HM-106	E CAPACITOR	10μF,50V
	C3026	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C3027	NCB21EK-104X	CAPACITOR	0.1μF,25V
	C3034	NCB21HK-221X	CAPACITOR	220pF,50V
	C3042	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	C3043	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	C3306	NCB21EK-104X	CAPACITOR	0.1μF,25V
	C3307	NCB21EK-104X	CAPACITOR	0.1μF,25V
	C4001	NDC21HJ-101X	CAPACITOR	100pF,50V
	C4002	NCB21HK-102X	CAPACITOR	0.001μF,50V
	C4004	NCB21HK-102X	CAPACITOR	0.001μF,50V
	C4006	QEKJ1HM-105	E CAPACITOR	1μF,50V
	C4007	NCB21EK-104X	CAPACITOR	0.1μF,25V
	C4008	NCB21EK-103X	CAPACITOR	0.01μF,25V
	C4010	QEKJ1CM-106	E CAPACITOR	10μF,16V
	C4011	QEKJ0JM-107	E CAPACITOR	100μF,6.3V
	C4013	QEKJ1CM-106	E CAPACITOR	10μF,16V
	C4015	NCB21HK-222X	CAPACITOR	0.0022μF,50V
	C4017	NCB21CK-563X	CAPACITOR	0.056μF,16V
	C4018	NDC21HJ-221X	CAPACITOR	220pF,50V
	C4201	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	C4202	NDC21HJ-390X	CAPACITOR	39pF,50V
	C4203	NDC21HJ-220X	CAPACITOR	22pF,50V
	C4204	NCB21EK-103X	CAPACITOR	0.01μF,25V
	C4206	NDC21HJ-470X	CAPACITOR	47pF,50V
⚠	C5001	QFZ9051-683	F CAPACITOR	0.068μF,250V
⚠	C5005	QCZ9071-222	CAPACITOR	0.0022μF,400V
	C5006	QEZ0374-826	E CAPACITOR	82μF,400V
	C5101	QCZ0212-472	CAPACITOR	0.0047μF,1kV
	C5102	QCZ0302-330Z	CAPACITOR	33pF,1kV
	C5104	QETC1HM-105	E CAPACITOR	1μF,50V
	C5105	QFN31HJ-183	F CAPACITOR	0.018μF,50V
	C5106	QCBB1HJ-271	CAPACITOR	270pF,50V
	C5107	QFVF1HJ-104Z	F CAPACITOR	0.1μF,50V
	C5201	QEMU0JM-227	E CAPACITOR	220μF,6.3V
	C5202	QEMT1CM-827	E CAPACITOR	820μF,16V
	C5203	QETC1CM-227	E CAPACITOR	220μF,16V
	C5204	QEMT1AM-687	E CAPACITOR	680μF,10V
	C5205	QETC1AM-227	E CAPACITOR	220μF,10V
	C5207	QETC1JM-106	E CAPACITOR	10μF,63V
	C5208	QETC1HM-106	E CAPACITOR	10μF,50V
	C5301	QETC1AM-107	E CAPACITOR	100μF,10V
	C5302	QETC1HM-106	E CAPACITOR	10μF,50V
	C5303	QETC1CM-107	E CAPACITOR	100μF,16V
	C5306	NCF21HZ-103X	CAPACITOR	0.01μF,50V
	C5307	QETC1HM-474	E CAPACITOR	0.47μF,50V
	C5308	NCB21HK-102X	CAPACITOR	0.001μF,50V
	C5309	QETC1AM-107	E CAPACITOR	100μF,10V
	C5310	QETC1CM-226	E CAPACITOR	22μF,16V
	C6006	NCB21HK-471X	CAPACITOR	470pF,50V
	C6008	NCB21HK-103X	CAPACITOR	0.01μF,50V
	C6012	QETN1AM-227	E CAPACITOR	220μF,10V
	C6014	NCB21EK-473X	CAPACITOR	0.047μF,25V
	C6016	NCB21HK-471X	CAPACITOR	470pF,50V
	C6020	NDC21HJ-101X	CAPACITOR	100pF,50V
	C6021	NDC21HJ-101X	CAPACITOR	100pF,50V
	C6022	NDC21HJ-101X	CAPACITOR	100pF,50V
	C6023	NCB21HK-471X	CAPACITOR	470pF,50V
	C6024	NCB21HK-471X	CAPACITOR	470pF,50V
	C6032	NCB21HK-153X	CAPACITOR	0.015μF,50V
	C6036	NCB21HK-682X	CAPACITOR	0.0068μF,50V
	C7169	QEKJ1CM-476	E CAPACITOR	47μF,16V
	C7170	NCB21EK-103X	CAPACITOR	0.01μF,25V
	C7171	QETC0JM-477	E CAPACITOR	470μF,6.3V
	L1	QQL29BJ-100Z	COIL	10μH
	L4	QQL29BJ-100Z	COIL	10μH
	L7	QQL29BJ-100Z	COIL	10μH
	L8	QQL071J-820Y	COIL	82μH
	L9	QQL29BJ-100Z	COIL	10μH
	L18	PELN1203	COIL	12μH
	L23	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
	L202	QQL29BJ-330Z	COIL	33μH
	L203	QQL29BJ-220Z	COIL	22μH
	L204	QQL29BK-1R0Z	COIL	1μH
	L252	QQL29BJ-220Z	COIL	22μH
	L2251	QQL29BJ-100Z	COIL	10μH
	L2252	QQL29BJ-151Z	COIL	150μH
	L3003	QQL29BJ-100Z	COIL	10μH
	L5201	PELN1184	COIL	33μH
	L5202	PELN1184	COIL	33μH
	L5301	QQL01BK-101Z	COIL	100μH
	L6002	QQL29BK-1R0Z	COIL	1μH
	CF3001	QAX0356-001Z	RESONATOR	
	CF3301	QAX0356-001Z	RESONATOR	
	X1	QAX0436-001	CRYSTAL RESONATOR	
	X2	QAX0435-001	CRYSTAL RESONATOR	
	X3001	QAX0445-001	CRYSTAL RESONATOR	
	X4201	PEVB0645	CRYSTAL RESONATOR	

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	K5101	QQR0678-001Z	FERRITE BEAD	
	PC3001	GP3S123	PHOTOTRANSISTOR	
	PC3002	GP3S123	PHOTOTRANSISTOR	
⚠	PC5101	ON3171/R/	IC(PHOTO COUPLE)	
	T2051	PELN0832	OSC TRANSFORMER	
⚠	T5001	QQS0021-001	SW TRANSFORMER	
	TU6001	QAU0084-001	TUNER	
	TB1	LP30360-008B	TERMINAL BOARD ASSY	
	OT1	QYTDSF3008Z	SCREW,X2 TERMINAL	
	ET1	PQ21623-1-3	EARTH PLATE(RF),TUNER	
	ET2	PQ21623-3	EARTH PLATE(RF),REG	
	HD1	QNZ0032-001	BATTERY HOLDER,TERMINAL	
	WR1	ML-PU4017A	PARALLEL WIRE,TERMINAL	
	SD1	LP30364-001A	S.CASE(PRE/REC)	
	HS1	PQ45788-1-2	HEAT SINK,Q5101	
	OT2	QYTDST3006Z	SCREW,Q5101	
⚠	F5001	QMF51E2-1R6J1	FUSE	T1.6A
	FC5001	QNG0006-001Z	FUSE CLIP,F5001	
	FC5002	QNG0006-001Z	FUSE CLIP,F5001	
	J7108	PU61012	MINI JACK,R.PAUSE I/O	
	J7161	PEMC1156	PIN JACK(SW),AV IN RCA	
	J7162	PEMC1157	PIN JACK,AV OUT RCA	
⚠	LF5002	QQR0532-001	LINE FILTER	
	CN1	QGF1018C1-11	FPC CONNECTOR,(1-11)U.DRUM	
	CN2001	QGF1207C1-07	FPC CONNECTOR,(1-7)A/C HEAD	
	CN2002	QGB2532J1-02	CONNECTOR,(1-2)FE HEAD	
	CN3001	QGB2015M1-08	CONNECTOR,(1-8)CAP MOTOR	
	CN3003	QGB2532J1-02	CONNECTOR,(1-2)L.MOTOR	
	CN3004	QGB2534J2-04	CONNECTOR,(1-4)R.ENCODER	
	CN3005	QGF1207C1-12	FPC CONNECTOR,(1-12)SW DISPLAY	
	CN3008	QGD2001C1-02	CONNECTOR,(1-2)LT BATTERY	
	CN4001	QGF1207C1-04	FPC CONNECTOR,(1-4)DRUM MDA	
⚠	CN5001	QGA7901C3-02	CONNECTOR,(1-2)AC IN	
	CN7162	QGF1207C1-05	FPC CONNECTOR,(1-5)FRONT	
⚠	CP3003	ICP-N20	CIRCUIT PROTECTOR	
⚠	CP4001	ICP-N15	CIRCUIT PROTECTOR	
⚠	CP5301	ICP-N38	CIRCUIT PROTECTOR	
⚠	CP5302	ICP-N25	CIRCUIT PROTECTOR	

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AUDIO CONTROL HEAD BOARD ASSEMBLY <12>

REF No.	PART No.	PART NAME, DESCRIPTION
PW1	LPA10010-01A1	A/C HEAD BOARD ASSY
CN1	QGF1208F1-07	FPC CONNECTOR

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SW/DISPLAY BOARD ASSEMBLY <28>

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	PW1	LPA10018-18A1	DISPLAY BOARD ASSY	
	IC7001	M35500BFP	IC	
		or M35500BGP	IC	
		or M35500AGP	IC	
	IC7002	PNA4652M00XB	IR DETECT UNIT	
		or GP1U281X	IR DETECT UNIT	
	D7002	RD9.1ES/B2/-T2	ZENER DIODE	
		or UZ9.1BSB	ZENER DIODE	
		or MTZJ9.1B	ZENER DIODE	
	R7001	QRE141J-471Y	RESISTOR	470Ω,1/4W
	R7002	QRE141J-471Y	RESISTOR	470Ω,1/4W
	R7003	QRE141J-471Y	RESISTOR	470Ω,1/4W
	R7004	QRE141J-471Y	RESISTOR	470Ω,1/4W
	R7005	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	R7006	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	R7007	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	R7008	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	R7013	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	R7014	QRE141J-0R0Y	RESISTOR	0Ω,1/4W
	R7015	QRE141J-0R0Y	RESISTOR	0Ω,1/4W
	R7020	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	R7021	QRE141J-122Y	RESISTOR	1.2kΩ,1/4W
	R7022	QRE141J-182Y	RESISTOR	1.8kΩ,1/4W
	R7023	QRE141J-222Y	RESISTOR	2.2kΩ,1/4W
	R7024	QRE141J-272Y	RESISTOR	2.7kΩ,1/4W
	R7025	QRE141J-472Y	RESISTOR	4.7kΩ,1/4W
	R7026	QRE141J-682Y	RESISTOR	6.8kΩ,1/4W
	R7027	QRE141J-153Y	RESISTOR	15kΩ,1/4W
	R7028	QRE141J-393Y	RESISTOR	39kΩ,1/4W
	R7030	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	R7031	QRE141J-122Y	RESISTOR	1.2kΩ,1/4W
	R7032	QRE141J-182Y	RESISTOR	1.8kΩ,1/4W
	R7033	QRE141J-222Y	RESISTOR	2.2kΩ,1/4W
	R7034	QRE141J-272Y	RESISTOR	2.7kΩ,1/4W
	R7035	QRE141J-472Y	RESISTOR	4.7kΩ,1/4W
	R7036	QRE141J-682Y	RESISTOR	6.8kΩ,1/4W
	R7037	QRE141J-153Y	RESISTOR	15kΩ,1/4W
	R7038	QRE141J-393Y	RESISTOR	39kΩ,1/4W
	R7052	QRE141J-393Y	RESISTOR	39kΩ,1/4W
	C7001	QDVB1EZ-223Y	CAPACITOR	0.022µF,25V
	C7002	QEKC1HM-106	E CAPACITOR	10µF,50V
	C7007	QEKJ1CM-476	E CAPACITOR	47µF,16V
	C7008	QDVB1EZ-223Y	CAPACITOR	0.022µF,25V
	C7009	QCSB1HJ-150	CAPACITOR	15pF,50V
	C7010	QCFB1HZ-104	CAPACITOR	0.1µF,50V
	C7011	QEKJ0JM-227	E CAPACITOR	220µF,6.3V
	S7001	QSW0456-002Z	TACT SWITCH,POWER	
	S7002	QSW0456-002Z	TACT SWITCH,CH+	
	S7003	QSW0456-002Z	TACT SWITCH,CH-	
	S7004	QSW0456-002Z	TACT SWITCH,REC	
	S7005	QSW0456-002Z	TACT SWITCH,PAUSE	
	S7006	QSW0456-002Z	TACT SWITCH,PLAY	
	S7007	QSW0456-002Z	TACT SWITCH,STOP/EJECT	
	S7008	QSW0456-002Z	TACT SWITCH,FF	
	S7009	QSW0456-002Z	TACT SWITCH,REW	
	S7010	QSW0456-002Z	TACT SWITCH,SIMUL	
	S7011	QSW0456-002Z	TACT SWITCH,SP/LP/EP	
	S7012	QSW0456-002Z	TACT SWITCH,C.RESET	
	S7013	QSW0456-002Z	TACT SWITCH,ST BOX	
	S7014	QSW0456-002Z	TACT SWITCH,COL.SYS	
	S7015	QSW0456-002Z	TACT SWITCH,REVIEW	
	S7016	QSW0456-002Z	TACT SWITCH,P.JOG-	
	S7017	QSW0456-002Z	TACT SWITCH,P.JOG+	
	FW7001	QUM032-07A4A4	PARA RIBON WIRE	
	J7191	PEMC1126	PIN JACK,VIDEO IN	
	J7192	PEMC0922	PIN JACK(SW),AUDIO(L)IN	
	J7193	PEMC0922	PIN JACK(SW),AUDIO(R)IN	
	DI7001	QLF0032-002	FL TUBE	

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	HD1	PQ34668	FDP HOLDER(L),DI7001
	HD2	PQ34669	FDP HOLDER(R),DI7001
	OT1	LP30002-052A	SPACER,X2
	CN7001	QGF1208C1-12	FPC CONNECTOR,(1-12)MAIN
	CN7191	QGF1207C1-05	FPC CONNECTOR,(1-5)MAIN

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REC SAFETY BOARD ASSEMBLY <32>

PW2	LPA10018-01B2	REC SAFETY BOARD ASSY
S7041	QSW0602-002	PUSH SWITCH

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LOADING MOTOR BOARD ASSEMBLY <55>

PW2	LPA10010-01A2	L.MOTOR BOARD ASSY
CN1	QGB2533K1-02	CONNECTOR

# ⚠	REF No.	PART No.	PART NAME, DESCRIPTION